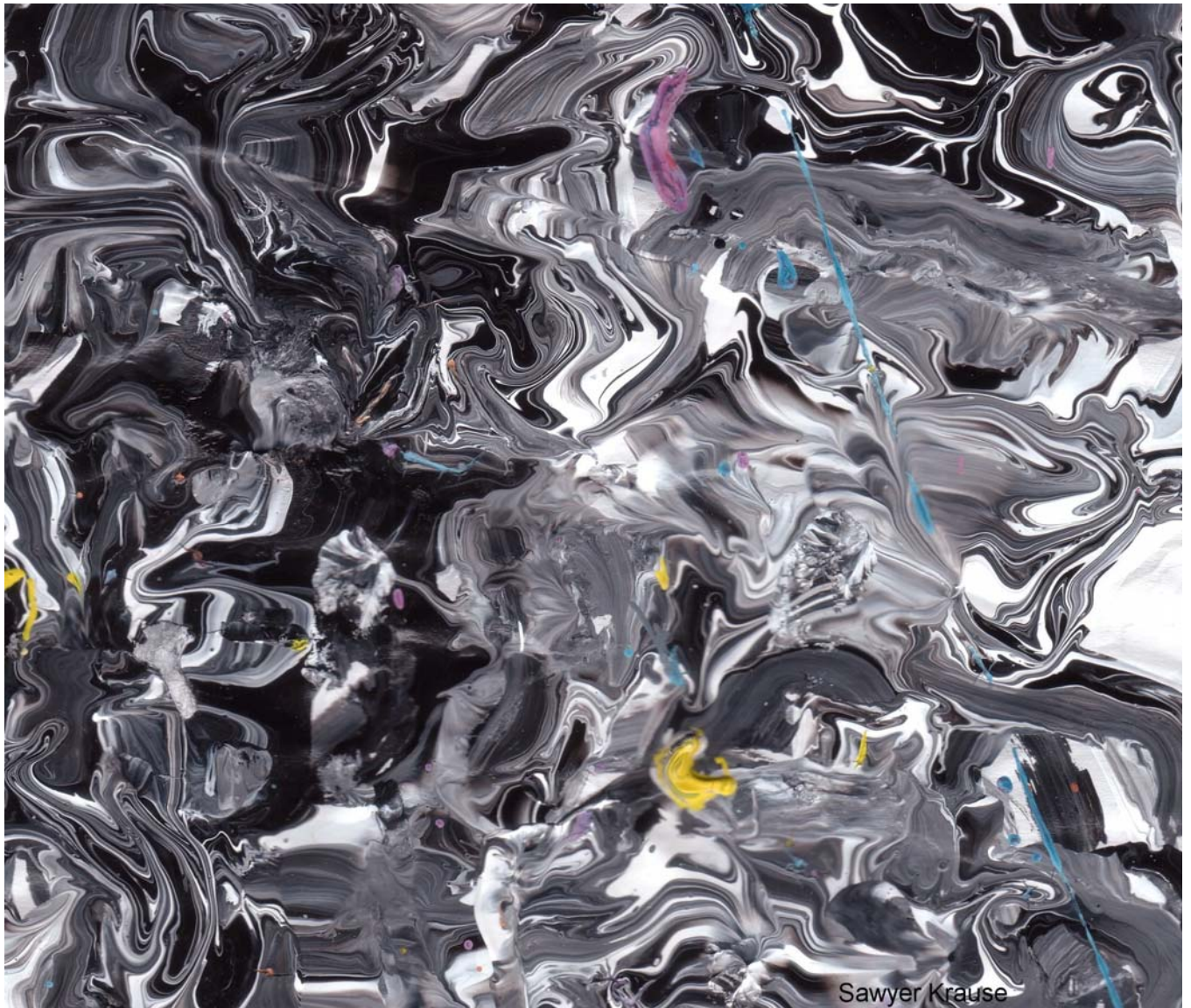


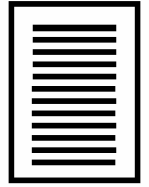
What Jump Space Looks Like



Sawyer Krause

WHAT'S OUTSIDE THE SHIP?

Jump space is an alternate universe controlled by alien laws of physics. By its very nature, it is destructive to matter and deadly to life.



Jump

Jump is the secret to interstellar travel: jump allows ships to travel around the ordinary distances of interstellar space and re-emerge light-years distant in about a week.

Jump Space is an alternative space in which the laws of physics from the true universe do not apply. Jump Space itself is alien: inimical to life and even to matter; it is only the special protections of the jump field that protect a hull and its contents from immediate destruction.

JUMP DRIVES

Ships enter jumpspace by activating an installed jump drive. The jump drive initiates the connection to jumpspace, maintains the ship within jumpspace, and precipitates the ship out of jumpspace.

INITIATION

Initiation is the transition from realspace to jumpspace. Initiation is centered on the jump drive, and extends out for some distance.

Jump Entry Flash. A ship entering jumpspace emits a blinding flash of energy equal to Ship Size plus Mod +4.

The ship's gravitational signature vanishes from any sensors.

Entry Flash is subject to lightspeed. For example, Jump entry at S=12 (= 30 Light-minutes) is detectable to sensors 30 minutes later.

FOR SIMPLICITY

Jump moves a ship from one star system to another in about a week. Travel from the Start World to the Jump Point takes about a day, as does travel from the Jump Point to the Destination World. Only if the unusual happens should details of jump be considered.

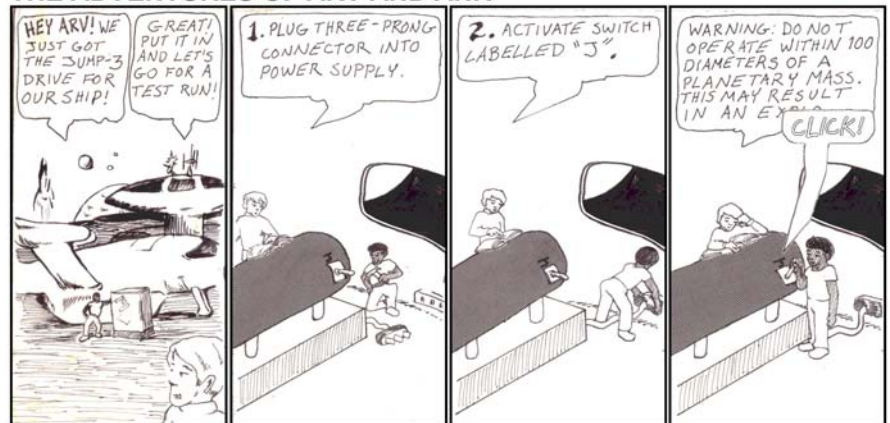
Jump Grid Versus Jump Bubble

Two alternate technologies are used for jump drives.

A **Jump Bubble** creates a Jump Field which extends outward from the Jump Drive and encloses the entire ship (and some distance of space beyond). Jump Bubbles allow non-continuous hulls and ships attached to other objects (if they fit within the Jump Bubble) to Jump.

A **Jump Grid** embeds a grid of Jump Field conducting wires with the hull, making the Jump Field conform to the Hull.

THE ADVENTURES OF ARV AND ANK



Initiation Interference

The vicinity of a jump initiation is a hazardous place. Any ship initiating jump affects smaller objects around it, and is affected by larger objects around it.

Smaller. Smaller objects within 100 diameters of the jumper at the moment the ship transitions into jumpspace suffer a mishap. The opening of Jump Space attempts to carry the smaller objects along, but generally fails, and they are dissipated into component molecules.

Larger. A jumper within 100 diameters of an object larger than itself at the moment the ship attempts to transition into jumpspace finds the larger object interferes with the process. The jump process usually fails and often the jumper is dissipated into component molecules.

Ships must move to 100 D or farther from every possible object (100 world diameters from a world; 100 star diameters from a star; 100 ship diameters from a ship) to attempt a safe jump.

Example: Drop Tanks. Drop tanks illustrate this hazard nicely. In preparation for a jump, drop tanks may be jettisoned at some stage prior to actually entering jumpspace. Being individually smaller than the jumping ship, the tanks suffer mishaps. If a jettisoned drop tank were larger than the jumping ship, the ship would suffer the mishap instead!

Example: Kinunir. A Kinunir-class ship is swarmed by several fighters, all within 100D of it. The ship jumps. At the moment the ship jumps, the fighters each suffer a mishap.

Extreme Example: The Ancients' War. Once upon a time, one of the rebel Grandsons parked a squadron of planet-killers in orbit around a small world and lay siege to one of Grandfather's bases. Grandfather then sprung his trap: he jumped the entire world. The ships of the squadron suffer mishaps.

The Jump Mishap

If Jump produces a Mishap, it cascades through a ship. Consult the Battle Damage charts once for each major component on the ship hit location chart. Determine the Severity of the Damage and the Severity of the Diagnosis for each.

The Jump Drive Balance

A jump drive must be strong enough to enclose the ship's volume with its jumpspace connection, but if it is too strong, initiation stalls.

Even the smallest jump drives stall with any ship smaller than 100 tons, creating an effective lower limit to practical starships.

A 50-ton ship with a minimal size Jump Drive stalls.

That same ship with two 25 ton droptanks, provided that the tanks are not dropped when jumping, is capable of Jump.

SHIPS IN JUMPSPACE

A ship normally remains in jump for 168 hours, plus or minus 10%. Well-tuned ships (usually military) can *choose* the variation, within 1% accuracy.

Time in jump is independent of the distance travelled, or even of events in realspace.

Undetectable. Ships in jumpspace are undetectable. There is no known system available to detect the presence of ships in jumpspace.

There are some psionics who claim to be able to detect ships in jump, but tests remain inconclusive.

Straight Line Courses. The starting and ending points are connected by a straight line course. The length of the course determines the distance of the jump: any distance up to 1 parsec (including in-system jumps) is Jump-1; any distance beyond that up to 2 parsecs is Jump-2.

The maximum jump distance is theoretically unlimited but as a practical matter has a maximum of 9 parsecs.

PRECIPITATION

The end of jump is technically called Precipitation and more commonly called **Breakout**.

A ship may exit jump space in two ways: at or near the point planned for, or at a point where the straight line course crosses a 100 diameter sphere.

Planned Breakout Point

The course plotted by the Astrogator may include a predicted point for breakout. A successful jump will carry a ship to that predicted breakout point within about S=5 (roll 1D-1). Naval ships roll Good Flux instead.

Breakout points are commonly used in naval operations when maneuvers take ships to locations relatively removed from astral bodies.

Crossing The 100 Diameter Sphere

An astrogator may plot a course which crosses the 100 diameter sphere around a star or world. A ship in jump space automatically breaks out at the point where that course crosses the 100-diameter sphere (with no variation). This technique places the ship in the best possible position to continue its voyage to a world.

Natural Safeguards. The physics of jump space force a ship out of jump space when it crosses the 100-Diameter Sphere. A ship cannot exit jump space within a world, planetoid, star, or even another ship.

Time to Breakout

A typical jump takes about a week (168 hours). The actual time spent varies randomly. Military ships can take slightly less time on average.

Squadron Maneuvers. Highly tuned drives in a squadron of ships, along with highly trained crews, can make their emergence from jump very close to the same time (within about a 5 hour window).

TIME IN JUMP

Flux	Commercial	Naval	T&T	Perfect
- 5	158	162	163.5	165.0
- 4	160	163	164.0	165.2
- 3	162	164	164.5	165.4
- 2	164	165	165.0	165.6
- 1	166	166	165.5	165.8
0	168	167	166.0	166.0
+1	170	168	166.5	166.2
+2	172	169	167.0	166.4
+3	174	170	167.5	166.6
+4	176	171	168.0	166.8
+5	178	172	168.5	167.0

Time to breakout is shown in hours.

Commercial. Commercial and private ships using standard drives.

Naval. Military ships in service.

T&T. Trained and tuned. Military ships with highly trained crews and carefully tuned drives.

Perfect. If the rolls produce a perfect jump +/- 0, reroll on the Perfect column.

DETECTION

Ships entering and leaving jump space can be detected.

Entering Jump: A ship entering jump disappears from detector screens. There is a pulse of energy which is detectable to Radar.

Leaving Jump. A ship leaving jump emits a pulse of energy which is detectable to Radar.

In Jump: A ship in jump cannot be detected. A ship in jump is incapable of detecting anything also in jump, or outside of jump.

Emergence Flash. A ship emerging from jumpspace emits a blinding flash of energy equal to Ship Size plus Mod +4.

The ship's gravitational signature appears to sensors.

Emergence Flash is subject to lightspeed (emergence at S=12 = 30 Light-minutes is detectable to sensors 30 minutes later).

Deliberate Precipitation. A ship can deliberately leave jump based on astrogation choices made at Initiation. An astrogator can pre-select (before jump initiates) any point in space (outside any 100D limits) and the ship will exit jump at that point.

Planned Precipitation. An astrogator can plot a straight line course which intersects a 100D volume. At the end of the time in jump, the ship precipitates out at the edge of that volume.

Typically, the 100D volume is centered on the ship's destination world.

Unplanned Precipitation. A straight line course may (inadvertently) intersect a 100D volume. As a result the ship is precipitated out of jumpspace at the edge of that volume (after about 168 hours in jump).

Good astrogators carefully review planets, satellites, asteroids, and comets along the planned course to avoid Unplanned Precipitation.

Nevertheless, most systems have a surrounding Oort Cloud with objects large enough to pose an astrogation hazard. Occasionally, a ship's straight line course intersects the 100D limit of an object bigger than the ship, triggering an Unplanned Precipitation.

Two considerations apply: larger ships are less vulnerable to Oort Cloud precipitation because there are fewer larger bodies; and the triggering body is usually a source of water ice or hydrogen suitable for refueling.

BASIC PERFORMANCE

Jump takes time, energy, and the appropriate drive.

Jump Ranges. The jump drives for a ship determine how far it can jump. Jump capacity can range from 1 to 9 (which is possible range in parsecs). A ship can make a jump equal to or less than its jump capacity. A ship with Jump-1 can travel one parsec in about a week; a ship with jump-6 can travel six parsecs in about a week.

Jump Time. All jumps take about a week: 168 hours plus or minus about 10%. Time spent in jump has no relation to the distance travelled.

Equivalent Speed. A ship which jumps one parsec in one week travels 170 times the speed of light.

TRANSLATING JUMP TO LIGHT SPEED

Jump	Approximately:
1	160 to 180 x the speed of light
2	320 to 360 x
3	480 to 540 x
4	640 to 720 x
5	800 to 900 x
6	960 to 1000 x

Astrogation. A jump must be planned before it is executed; this planning is the duty of the astrogator. Planning a jump involved plotting a straight line course from the jump point to the breakout point.

Restrictions. Jump cannot proceed within 100 diameters of body (star, gas giant, world, planetoid, or even another ship) larger than itself.

If a plotted course intersects a 100 diameter sphere around any object larger than the ship, the ship is "precipitated out" of jump space.

In System Jumps. It is possible to jump within a star system: The jump still takes a week (168 hours or so). In some cases, the jump is more efficient than maneuver drive.

Jump Points

The location at which a ship enters jump space is called a **Jump Point**. There are technically an infinite number of Jump Points, but some are more efficient than others. Jump Points must meet certain criteria.

Outside the 100 Diameter Sphere. A jump point must be at least 100 diameters from every astral body (star, planet, gas giant, planetoid, or other object).

In Vacuum/ Space. By inference, a jump point which is outside the 100 diameter sphere is in vacuum.

POWERING THE JUMP DRIVE

Initiation requires a very large input of energy in a very short time period. Once in jumpspace, the energy to maintain jump is minimal. Transition back to real space requires no additional energy (and precipitation releases a blinding flash of energy [as neutrinos and photons]). A portion of the energy generated during jump initiation is retained in jumpspace.

Power Plants

Starship Power Plants are "small" fusion generators comparable to the standard plants used on world surfaces.

The key to their importance is called *Overclock* capability. A ship Power Plant can increase its output by several orders of magnitude for a period of seconds, with great inefficiency. This ability even makes normal operation relatively inefficient, with fuel usage measured in tons per week rather than tons per year. In addition, each use of Overclock increases the

chance of failure (which is why starship Power Plants require annual maintenance).

First Imperium Power Plants. When the First Imperium developed jump drive, its ships had power plants with OverClock=15, barely enough to make Jump-1 work. A 1000-ton Jump-1 ship had barely 30 tons cargo capacity after filling the hull with an inefficient power plant and fuel tankage. Most ships were 2000 tons or larger.

Later Power Plants. Improvements in Overclock were the primary basis for smaller ships, for greater Jump capability, and for larger cargo capacity.

Around -5430, technological advances in OverClock achieved OC=25 and made J-2 possible. This jump superiority marked the start of the Consolidation Wars to exterminate competing technologies.

OVERCLOCK EXAMPLES

Hull	TL	OC	J	P	J-Fuel	J-Fuel%	Free Tons*
1000		10	55	310	1,000	100%	- 365
1000		15	55	207	667	67%	72
1000	9	20	55	155	500	50%	290
1000		25	55	124	400	40%	421
1000		30	55	103	333	33%	508
1000		35	55	89	286	29%	571
1000	10	40	55	78	250	25%	618
1000		45	55	69	222	22%	654
1000		50	55	62	200	20%	683
1000		55	55	56	182	18%	707
1000	11	60	55	52	167	17%	727
1000		65	55	48	154	15%	743
1000		70	55	44	143	14%	758
1000		75	55	41	133	13%	770
1000		80	55	39	125	13%	781
1000		85	55	36	118	12%	791
1000	12	90	55	34	111	11%	799
1000		95	55	33	105	11%	807
1000	13	100	55	31	100	10%	814
1000	14	110	55	30	95	9%	820
1000	15	120	55	26	83	8%	836
1000	17	140	55	22	71	7%	851
1000	18	160	55	19	63	6%	863
1000	21	180	55	17	56	6%	872
1000		200	55	16	50	5%	880

* Free Tons= tons available for all other functions including maneuver, weapons, quarters, and cargo.
OC=100 is the standard available.

Look through this table: as Overclock increases, Power Plant size decreases and the required Jump Fuel percentage decreases.

Overclock Rates are Historical. Within an era or milieu or culture, the same Overclock Rate predominates regardless of Technology Level.

The Fantastic Drive

The very high-tech alternatives to Jump Drive (the Hop Drive and the Skip Drive) may very occasionally be encountered. They are forms of Jump Drive, and where Jump is used, generally Hop or Skip may be substituted.