# Subspace Vortex

**WIP:** This article is a work in progress and is not yet approved for usage in the RP.

A growth upon existing subspace FTL technologies, the Subspace Vortex system is evolutionary rather than evolutionary. It works by creating a controllable current of subspace, allowing for full manoeuvring and combat operation at FTL and near-FTL speeds, rather than moving at FTL strictly point to point.

This is however tremendously dangerous, demanding special training on the pilot, specialised piloting systems which anticipate and respond to actions BEFORE they happen and a craft hull and systems especially designed for the vortex system (meaning transmission pylons and control surfaces).

Invariance of how much the craft is in subspace and how much it is not create enormous hull stresses and tremendous heat buildup, especially over control surfaces during manoeuvring. In addition, the vortex cannot be maintained for more than a few hours at a time due to exponentially growing material wear – with higher velocities suffering lower operational durations.

# A basic Introduction

## An intro to traversing different mediums

The main advantage to a carrier verses a fighter traditionally is the fact that the two move in two mediums: The carrier is bogged down by water which is very dense though also very stable and capable of carrying massive weight with very little effort. Air on the other hand, offers very little resistance and allows the fighter to achieve very high speeds.

The fighter does this by using its engines to generate a forward push. This push forces air over its wings which then create a pressure differential, negating the massive weight of the craft to create lift.

### An intro to FTL

This is essentially the primary principle behind subspace FTL technologies: That just as air is less ‘sticky’ than water, subspace is less sticky than three dimensional space, offering less resistance and thus higher speeds.

The way in which these technologies achieve subspace FTL however, is not flight in the traditional sense: there is no pressure differential.

Instead, the approach is closer to that of a rocket, throwing huge thrust at the ground (three dimensional space) to create lift. Any object, given enough thrust, can be made to ‘fly’ in a single direction. Unfortunately, this style of FTL doesn’t really allow for course-corrections — since it places enormous

stress on the hull. To try and curve or change direction would simply rip the hull apart.

### Augmented Subspace

In a nutshell, the nozzle of the 'rocket' can be vectored (the thrust tilted off axis) to create very minor course corrections and overcome stalls.

### Subspace warp

The next logical step in subspace FTL evolution was Subspace Warp: An approach closer to a helicopter. The craft does create push but it also creates pull — a vacuum above itself, allowing it to slickly flow through space. While quite efficient, it is very loud and noisy (granted, less 'noisy') than the 'rocket' and can to a very very limited degree change course during its flight.

### Hyperspace fold

Next came hyperspace fold: Instead of having a massive bulky engine, why not form a slingshot behind yourself, build up potential by stretching space then once you have enough energy to leave one layer and enter another, throw yourself forward through a fold in space?

Unfortunately, fold doesn't allow for course-correction since the object (save for a brief acceleration off one layer of space and onto the other) seemingly vanishes and reappears elsewhere. Instead, the object can be stopped prematurely, collapsing noisily back into three dimensional space and then make another jump, meaning jump patterns can intentionally be very erratic.

There are many advantages though:

- the slingshot is generated by energy fields rather than hardware (which while its very loud to sensors at departure, has very little in the way of loud electromagnetic noise on arrival, making it very very stealthy for injecting a unit behind enemy lines).
- In addition, there's relatively little to go wrong, since the slingshot (which again isn't a physical component) is formed disposable and leaves little to no trace of itself after departure and even better,
- hyperspace fold systems are extremely portable, making them highly desirable for military purposes.

## Subspace vortex

With these things in mind, Subspace Vortex is a new approach, akin to the aircraft picking up differential beneath its wings and needing very little thrust to enter. Like a fighter, this offers excellent course-correction inside FTL (allowing the craft to conduct the MAJORITY of its operations at FTL speeds) and

expends much less energy — and becomes almost invisible electromagnetically.

Unfortunately, spacial aerodynamics must become a primary design concern of the craft using the subspace vortex technique, dictating the exterior design and shape of the craft (not unlike how aerodynamic concerns shape a plane). In addition, should the craft's differential drop beneath a certain tolerance, it will drop out of subspace, potentially leaving it a sitting duck.

One major advantage to the subspace vortex is that it can enter areas traditionally deemed FTL dead-zones by dragging with it a micro-pocket of conventional space with it that tightly conforms to its hull. If struck inside the FTL deadzone or the pocket is stripped away, it will stall unless the pocket can be restored before it vanishes completely. Stalling inside an FTL deadzone has its very obvious dangers: primarily that leaving it may take months, years, decades or even centuries.

Potentially, even higher speeds are possible for brief periods of time (ideal for interception) but the shockwaves of space created by these higher velocities create enormous stresses on the hull and the aerodynamic control profile of the craft which must be adapted specifically to face these challenges. In addition, the 'stickiness' of space can become a problem if the displacement-profile of the craft in subspace isn't "smooth" enough, creating subspace-friction which could potentially destroy the craft.

Motion inside the subspace vortex can only be maintained for a set duration before the craft has to collapse back into normal space, losing its mobility advantage.

- Displacement profile: the parts of the craft which switch medium by dipping into subspace. The more of the craft is there, the less resistance space offers meaning higher speeds. Generally the displacement profile is the entire craft
- Control surface: Surfaces of the craft which change the shape of the vortex and the amount of friction, allowing for razor sharp course-corrections at faster-than-light speed necessary for manoeuvring.
- Vortex: The twist of space over the hull of the craft, like a corkscrew. While normally a bubble about a craft in most solutions, the vortex' shape can be intentionally changed by the craft allowing for course-corrections. This requires complex and heavy equipment to do precisely without collapsing the vortex or ripping the ship in half with invariance.
- Invariance: Differing displacement over the hull of the craft, leading to different stress. Generally, the craft has to be very intentionally designed to endure stress over specific areas to manoeuvre using control-surfaces – planned invariance. Unplanned invariance over parts of the ship not designed to endure these forces will be torn apart in three dimensions, commonly from the inside out.
- Pressure differential: The density of the vortex' inner layers (which pocket the craft) verses its outer-layers (which lubricate space). Generally presented as a ratio. Higher difference generally translates to higher speeds and operational endurance: eg, 1:1000 is better than 1:100
- Bleeding: The act of causing intentional invariance to manoeuvre.
- Subspace catapult: A device which can throw a craft using subspace-vortex technology at a speed beyond which its own engines are capable for a short distance, using the slingshot principle. Ideal for interception purposes.

# OOC notes:

Tl;dr: An excuse to have somewhat more conventional dogfighting in space and make fighters relevant again.