## Test - Spatial Movement

**21 March 2015**

### 1.1 Spatial movement system

In the Full Thrust cinematic rules spacecraft move as if they were ships or aircraft, a tradition established by decades of sci-fi TV and film. It is unrealistic, but fast and easy.

The spatial movement rules presented here recognise that spaceships navigate in their own unique environment. These rules are not physically accurate, as depicting true Newtonian motion on a tabletop is complicated and time consuming. Instead these rules concentrate on the challenges – and opportunities – for the commander. Battles fought using spatial movement unfold differently to those using cinematic, but are no less interesting.

The key differences from classic cinematic are:

- Ship facing can be different to course.
- Changing course becomes more difficult as velocity increases.

The key differences from the previous vector movement rules are that courses and facings are measured in clock points, not degrees.

#### Core concepts

Course and facing continue to be measured in clock points. A major advantage of using clock points is that they are easy to record, and easy to restore when ship models are picked up, bumped, or otherwise disturbed. Trying to track exact courses with degree precision is best left to computers.

The ship's main drive provides thrust for all acceleration, deceleration, and course changing. The main drive is assumed to be capable of 'off-axis' thrust to a limited extent through the use of differential thrust from multiple components, vectored thrust nozzles, or equivalents. Ships are assumed to also have thrusters for rotation and fine position adjustments when docking, but these are not powerful enough for velocity or course changes in battle.

In space, pivoting 60° doesn't take twice as long as pivoting 30° , but the exact time can only be calculated knowing the ship moment of inertia, dimensions, thrust levels, and maximum possible angular velocity. To keep things simple, these rules don't require this. Instead these rules assume that ships can pivot quickly, but there is a radial velocity limit which if exceeded will prevent the ship and crew from being able to effectively attack or defend themselves.

The thrusters used for rotations, or *pivots*, are assumed to take damage proportionately with the main drive. This removes the need for separate symbols and threshold checks.

When using these movement rules, ships can *never* fire ship to ship weapons through their rear arc.

### 1.2 Course and facing

In spatial movement the ship *course* is the direction of motion, while the *facing* is the direction that the bow of the ship points to. Unlike cinematic, a ship can face a different direction to that it is moving. Changing the course of a ship is turning, while changing the facing is a pivot.

Both course and facing are still measured in clock points. The facing is the orientation of the ship model itself on the table, while the course is represented by a small arrow marker placed near the base and recorded on the ship order sheet. In the figure below, the ship is moving along course 11 with facing 4.

Figure 1: Ship facing away from course

Velocity is the distance travelled in MU along the course. A ship travelling at velocity 6 along course

11 has this written on the order sheet as current motion *6@11*.

### 1.3 Pivots

A ship changes facing with a pivot order, writing 'F' and the new facing, for example *F10* to change facing to 10 o'clock. For convenience, pivots written as *FF* or *FA* mean pivot to face fore or aft exactly in line with the current course; and *FP* or *FS* mean pivot to face exactly 3 clock points (90° ) away from the current course. Unlike cinematic movement there is no limit to the number of pivots a ship can perform in one turn, nor is it limited to using only half the available thrust.

For ships with a standard drive each pivot costs 1 thrust point, because the time taken to change facing reduces the time available to thrust along either the old or new facing. Ships with advanced drives have no pivot cost. (Main drive thrust while pivoting is ignored in these rules, as it is less effective and more complicated.)

A ship with a destroyed main drive cannot pivot, even it has an advanced drive.

### 1.4 Changing velocity

To change velocity a ship with a standard drive must be facing forward in line with the current course to accelerate, or facing directly opposite to course to decelerate. If the ship is not so aligned at the start of the turn, the movement orders will have to include a pivot to the appropriate facing first.

A ship with an operational advanced drive can change velocity from any facing. This is because either such ships can pivot much faster than ordinary ships, or because the drive can exert force in any direction, not just straight ahead.

A velocity change is just indicated by writing *+V* or *-V* where V is any value up to the remaining thrust points for this turn. If the ship's velocity becomes negative, the course is flipped by six clock points (180° ), and the velocity becomes positive. A ship can only change velocity once per turn.

In the figure below are two ships with thrust 5 drives and current velocity and course *4@1*. Without first pivoting, the ship on the left could accelerate up to 9. The ship on the right could decelerate to -1, which would become velocity 1 @ course 7.

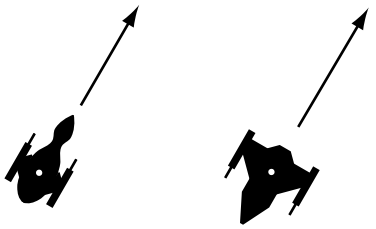

Figure 2: Ships ready to change velocity

As in cinematic, a velocity change takes effect immediately and the ship moves a distance equal to the new velocity on that turn.

### 1.5 Changing course

If a ship is halted with zero velocity, it can change course just by pivoting into alignment with the desired course and then accelerating.

To change the course of a moving ship with a standard drive, it must face more than one clock point away from the current course, if necessary by first ordering a pivot, and then thrust. In the figure below, a ship with course 1 can change course to port if facing 9, 10, or 11; or to starboard if facing 3, 4, or 5.

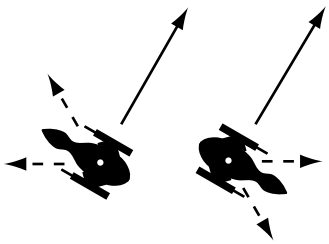

Figure 3: Ship ready to change course

Ships with advanced drives can change course from any facing, since pivots have no cost.

The order itself is written as *TN* to turn using *N* thrust points. The outcome depends on the ratio between the thrust points in the order and the current velocity:

- If the thrust is equal to (or greater than) the current velocity, the ship changes course by 2 clock points.
- If the thrust is equal to half the velocity rounded down, the ship changes course by 1 clock point.
- If the thrust is equal to one quarter velocity rounded down, the ship changes course by 1 clock point *but* this is delayed until the end of movement, not the beginning.

In the figures below, a ship with main drive 4, current course and facing 12, orders a pivot to port and then the remaining thrust, *PPT3*.

If the ship is travelling at velocity 1-3, it changes course by two clock points; at velocity 4-6 by one.

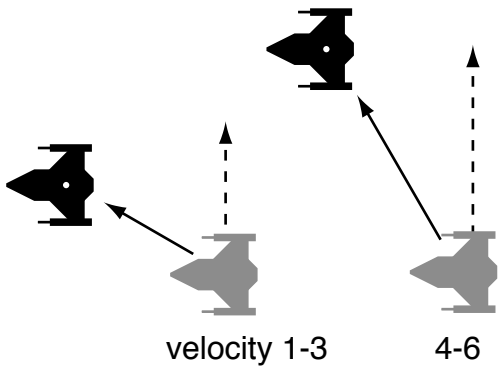


Figure 4: Changing course

At velocity 7-12 the ship changes course by one clock point at the end of movement, taking effect next turn. If the ship is travelling at velocity above 12, 3 thrust points are not enough to change course.

### 1.6 Pushes

A *push* is a combination of pivots and thrusts that move the ship's course a short distance sideways

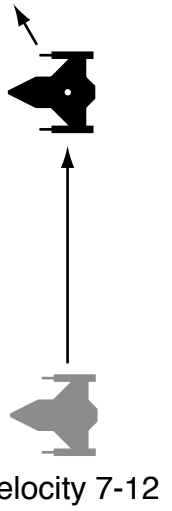


Figure 5: Delayed course change

without actually changing direction. A push can be useful to avoid small obstacles, other ships, or missiles.

A push is written as *Push P* or *Push S* for port or starboard relative to the current course. For ships with a standard drive the push costs 2 thrust points, for ships with advanced drives 1. The effect is to move the ship one MU to port or starboard of it's current position. After the push, the ship moves at the same velocity along the same course. In the figure below, a ship with course 12 and facing 9 has executed a push to starboard.

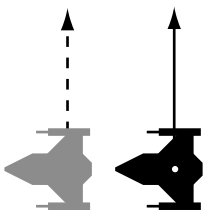

Figure 6: Push to starboard

A push is limited to 1 MU in distance. A ship cannot perform more than one push in a turn.

### Rolling ship

Rolling the ship is equivalent to a pivot and costs 1 thrust point for ships with standard drives, no points for ships with advanced drives.

### Spinning

A ship may choose to *spin*, moving along a fixed course with a constant rotation. A spin order must be the only action for that game turn and is not possible if the main drive has been destroyed.

To start a ship spinning, the player writes the special order *Spin rate*. The rate can be positive for clockwise or negative for counter-clockwise. The magnitude of the rate itself cannot be more than twice the current main drive rating. As with pivots, this represents the maximum rate at which the ship can still fight, not the maximum possible.

Once the spin order has been given, each turn the ship moves at its current velocity along the course as normal. It also changes facing by the rate specified. This continues on subsequent turns until the spin is changed to zero. A spinning ship cannot perform any other manoeuvre, but can fire weapons and defend itself as usual; and can write new spin orders.

**Optional rule**: a ship spinning at rate 12 or above can shoot at any target within range with any weapon, not subject to the usual firing arc restrictions. (Sometimes called a 'Death Blossom'.) Use the position of the ship at the end of turn for determining ranges.

## 1.7 Combined orders

A ship can change velocity, change course, push, and roll in a single turn, if it has enough thrust points. The only manoeuvre that cannot be combined with others is starting or stopping a spin. Each action in a turn takes effect immediately and affects further actions. A ship at velocity 6 that accelerates to 8 and then turns 2 clock points to port must therefore spend 4 thrust points on the turn; decelerating to 4 would reduce the turn cost to 2 thrust points.

## 1.8 Fighters

To avoid record keeping, fighters in spatial movement always move with facing equal to course. They can however attack any target within range over a full 360 degree arc around the group.

Unlike cinematic, fighters in spatial movement do have a turning cost. A fighter group may move up to maximum distance anywhere within their 60° front arc, ie not changing course by more than 1 clock point. They may move up to two-thirds maximum distance within the 60° fore port and fore starboard, changing course by up to 2 clock points; and up to one-third maximum distance when changing course by up to 3 clock points (90° ). At the end of movement, align the group facing with the clock point nearest to their direction of travel.

The figure below shows moves that can be made by a standard fighter group with move distance 24 MU and initial course and facing of 12.

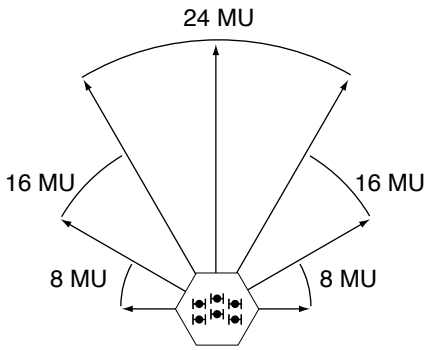


Figure 7: Fighter movement

Changing course by more than 3 clock points costs the entire move distance, the group just pivoting on the spot. (Technically they spend half the turn moving forward while decelerating, and the other half building up speed in the new direction, bringing them back to where they started.)