STARFLIGHT: SPECTRUM of MOTION

The Third Dimension of Flight

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Author's Note: This article originally appeared as a second part of the Shades of Motion in 3-D article that appeared in Issue #6 of the Star Frontiersman. It is re-introduced here apart from the other Information that may have originally confused readers. The article is presented here with more examples and the diagrams in correct association with the information. To discuss this article, go to mystarftoniers.blogspot.com.

The following continues a series of articles that provides more realism to the Knight Hawks movement system. If the limitations of a two-dimensional map frustrate you, bring more detail to your game with the following rules for 3-D movement.

The original Knight Hawks rules and most strategy war games present only the 2 dimensions of length and width. Now you will learn how to play the game with the third dimension, depth.

Viewing an object from two angles to determine its true position in space is known as triangulation. Triangulation is the best means of tracking an object through a three-dimensional space. One vector developer claims that a third map is necessary for 3-D mapping, but this is incorrect. Triangulation is all you need. As long as you know where you are going on each map, 3-D mapping falls comfortably into place. In fact, it is much simpler than the aforementioned developer thinks.

> A ship may pass through another ship's hex on one map if they do not pass through the same hex on the other map.

DOUBLE MAPPING

Of course, it is easier to track the third dimension when distances are already measured for you. So using a grid map for both angles may be preferred. However, you don't need to use a large second map, unless you use non-delimited facing (not restricted by hex sides or points) or you simply prefer to. Instead, you can use the vertical track (See the *Vertical Track* box, next page) in the accompanying diagram (next page) or a ruler marked at each half-inch.

To track your movement in 3-D, move as normal (Use your current rate of movement plus ADF, and apply MR to change direction) with applicable modifiers the same as for two-dimensional movement, except divide it between both maps. For example, you can move 4 hexes on one map and 3 hex on the other map, representing that you moved 7 hexes.

However, because there are 3 directions of movement, one for each dimension, when mapping 3-D, both maps always share one common directionality so that you should move two directions on one map, and only one direction on the other map. On the horizontal map, you will count both your width and length, or longitudinal and latitudinal directions. (Since there is no horizontal or vertical in space, they are only considered perpendicular designations, without up, down, right, or left.) But on the vertical track or map, you will only count those hexes or squares on which you move away from the plane represented by the horizontal map (known as your altitude on a planet).

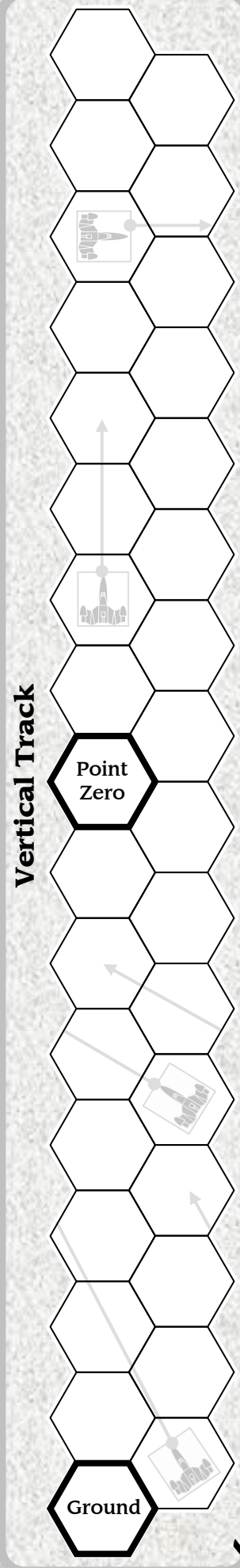
As a modification of one Knight Hawks rule, opposing ships may be on the same hex on one map, but in a different hex on the other; they must not be in the same hex on both maps.

HEIGHT TRACKING

Note that height tracking is the recommended form of tracking for miniatures, though double mapping can still apply if you have a second miniature to represent your ship, though this requires much more table room.

TRACKING HEIGHT ON PLANETS

When using a grid for a planet's surface, the third dimension of atmospheric flight can be simulated by keeping track of the craft's distance from a fixed surface, such



as the ground of a planet. Simply note the distance with the same measurement as the hexes on the planet's map. For simplicity, gravitational concerns will be given attention in a later article.

TRACKING DISTANCES OVER SHIPS

In the book "Ender's Game", by Orson Scott Card, the protagonist, Ender, resolves the problem of disorientation in space combat by making the target of the attack as equivalent to the ground, and that moving toward the target, the attacker is actually falling toward the target as if falling toward the ground. This tricks the mind into maintaining a stable orientation. This system also uses that means of orientation.

You may use objects other than a planet, such as the hull of a large nearby ship (likely the ship you are attacking or the ship from which you launch), in place of the ground on a map. The object you choose as "the ground" will always be on the same plane. Do not think of this as a focal point, but more as a flat surface. For ships as the ground, you can move below the field of the ship, but that ship should always represent a flat plain in relation to the surrounding stars.

When a small fighter is attacking a larger ship, the larger ship becomes the ground over which the fighter passes, striking specific targets, such as cannon emplacements. So while the larger ship may be traveling at 20,000 kph, the smaller ship is considered to be moving at say 600 kph in relation to the hull of the larger ship as if passing over the ground. This is only possible if the larger ship is stationary, or moving along a fixed path, otherwise moving target rules apply. This can be done by tracking movement on a second hex map. This form of triangulation can help facilitate quick movement.

MOVING "GROUND"

Of course, if you're a stickler for simulation, using the hull of a moving ship as your "ground" is going to have an effect on the movement of your ship. For every ADF of movement that the "ground" ship moves (10,000 km in 10 minutes), you must expend 1 extra ADF when moving faster in the direction of movement of the larger ship. If you are moving in the opposite direction, add your ADF in that direction to the ADF of the ship moving in the opposite direction. Also, you must maneuver your ship in relation to the forward movement of the "ground" ship. (Use this as the forward direction of your ship when calculating maneuvering movement). Though in a stationary position over the "ground" ship, you do not get to change the facing of your ship as if stationary. (You must still expend MR.)

You are now freed from the confines of a 2-dimensional map. While your fighter appears to be stationary on one hex, it could be moving at full speed in a perpendicular direction to the map. Now that you're moving in three dimensions, tracking hexes is only slightly more complicated, but once you get a hang of it, it will become as normal as moving in two dimensions, without all the geometry. ❖

THE VERTICAL TRACH

Use the hex at Point Zero (center) to determine the plane above and below which the action takes place. You do not need to use a ship to identify Point Zero if you don't want to or don't have one.

If you move in any direction other than vertical on the vertical track, just move the piece as if on a full map, cycling back and forth between left and right hexes as you move (as demonstrated by the arrows inside the Vertical Track), maintaining the chit's facing. If you need to, you may demonstrate the movement on the full map and then use the result to determine where it would end up on the vertical track.

You can also use the vertical track for atmospheric flight. In the atmosphere of a planet, consider the bottom hex to be connecting to ground level and disregard the second column of hexes. If the vessels are too far above ground level, then consider either the middle hex or the bottom hex as the "deck", below which is dangerous to enter.