

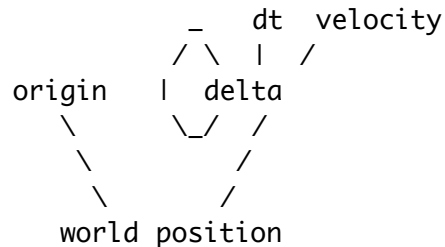
THE MOVEMENT PYRAMID

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This is a paradigm for enabling all kinds of necessary participant (and potentially entity) movement.

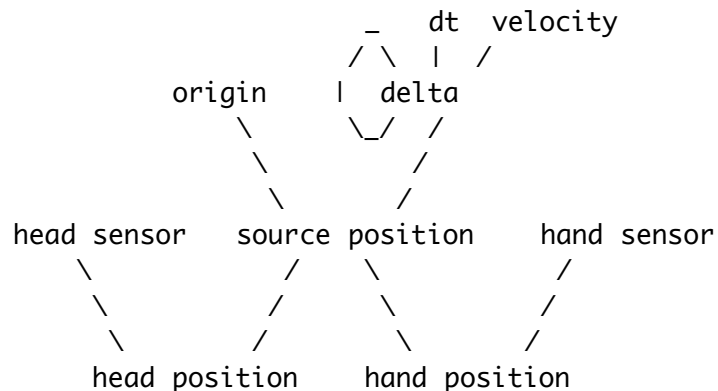
Here's the model:



The idea is that your world position is created from your origin and your delta from that origin. Usually, your origin will be the world origin. To "jack" into another entity, such as riding a vehicle, you want to maintain a specific delta from that entity and be able to fly around it (i.e. change your delta from it) but your origin will be that entity's position.

Your delta is created from your previous delta, your velocity, and the elapsed time. Origin, delta, and/or velocity are changed to move in the virtual world, depending on the type of movement desired. The model could also be expanded if necessary to include acceleration.

To round out the model in the case of the participant, and hopefully clear up a little confusion about how movement is made when using relative position sensors such as the Polhemus:



The world position of the virtual Polhemus source is created as above. The head and hand positions (or any other positions sensed by a Polhemus or any other such device) are created by adding the data read from the Polhemus to the current world position of the virtual source.

To fly, for instance, the velocity is set. The delta is then updated and the new world position of the virtual source is created relative to the current origin. The eyepoint and hand positions are then created by adding the sensor data to the world position of the source.

To jack into an entity, the origin is changed from the world origin (or some other origin) to be the current entity. The delta is changed either to the zero vector or to a predetermined offset from the entity.

In FERNII terms, body movement would involve at least three entities: head, hand, and sensor source. The sensor source would have three methods for movement - "set-origin", "set-delta", and "set-velocity". Every time it created a new position for itself, it would let the head and hand know what it is. Then, when they got new sensor data in, they'd create their world position relative to the source position. To fly, the wand would send "set-velocity" to the pol-source.