

JEOD Training

Key Models Survey
(add how they fit into a simulation)

DynManager

- The key to JEOD operations; MUST be included in all JEOD simulations (requires the Time Model)
- Maintains registries of all dynamic objects (Planets, DynBodies, MassBodies, GravityBodies, RefFrames, etc.)
- Orchestrates simulation initialization
- Manages the Reference Frame tree, including all active ephemerides models
- Manages all dynamic elements of a simulation
- Responsible to ensure all required state integrations are performed appropriately

Ephemeris

- Provides state updates for key solar system bodies (e.g. planets) that will not be integrated by JEOD
- Three modes: Empty Space, Single Planet, Ephemeris
- Starting with version 3.3, two industry-accepted standard models:
 - JPL DE405, DE421
 - Provides Sun, all planets, Pluto, Moon
 - JPL SPICE
 - Allows for many more celestial bodies (asteroids, moons, etc.)
 - Must be downloaded separately, but interfaces seamlessly
- PropagatedPlanet allows integration of a specific celestial body
 - Allows to add e.g. Phobos, Deimos, asteroids
 - Allows switching between ephemeris and integration for DE4xx objects

Gravity Model

- Manages gravitational calculations for all planets/objects provided/specified
- Allows individual control of gravitational effects on a per-vehicle, per-planet basis
 - Gravity on/off for a particular object on that vehicle
 - Point-mass or non-spherical gravity
 - Different non-spherical degree and order per vehicle
- Optional module adds gravity gradient calculations

(Discuss pieces and distinctions – GravityBody, GravityModel, GravityControls, GravityGradient)

DynBody

- Simulates the dynamics of a space vehicle
- All vehicle-specific JEOD models connect to it
- With DynManager, allows for attach/detach of vehicles while maintaining consistency of states
- MassBody allows for e.g. fuel tank modeling