Satellite and Orbit editing for Space Simulation: AEROPVS030

In vsTASKER, you can edit satellites and orbits directly within the scenario using Two-Line Element (TLE) datasets or by manually configuring the six standard Keplerian elements. The engine includes built-in propagators (SGP4 and Two-Body) to calculate accurate positioning over the Julian timeline, making external plugins largely unnecessary.

Editing and Defining Orbits

Orbit configurations in vsTASKER can be established using three primary methods:

- **TLE Data:** Automatically generate orbits by loading ephemeris files or inputting NORAD TLE strings.
- **State Vectors:** Manually define the position and velocity coordinates.
- **Keplerian Elements:** Input the six primary parameters (Semi-major axis, eccentricity, inclination, argument of periapsis, RAAN, and true anomaly) to build custom trajectories (e.g., Geostationary, Molniya, or Sun-Synchronous orbits).

Orbit Propagators

Once your orbit definition is complete, you can select from vsTASKER's provided propagators to move the satellite or spaceship along its path:

- **SGP4 (Simplified General Perturbation 4):** Standard model used for TLEs, considering atmospheric drag and orbital decay.
- **Two-Body Propagator:** Ideal for simplified Keplerian motion where only central-body gravity is considered.
- **Custom Propagator:** You can integrate bespoke code or scripts if your scenario requires specialized orbital perturbations.

Simulation and Visualization

With the orbit and propagator active, vsTASKER allows you to assess dynamic tactical factors such as satellite communications, payload management, earth/sun shadowing,

intercontinental ballistic missile (ICBM) detection, and ground-to-space visibility windows. For visualization, the system pairs its 2D map display with OpenSceneGraph (OSG) and osgEarth, enabling real-time or faster-than-real-time 3D tracking of the orbital paths over the globe.

For tips on how to visualize and configure satellite missions effectively:

Satellite Mission Simulation Tutorial | SSO Orbit with Free ...

If you want, tell me:

- Are you planning to import **NORAD TLE data** or create a **custom orbit** from scratch?
- Are you looking to simulate **satellite communication** or **ground coverage analysis**?

I can provide the specific steps or scripts required for your exact scenario.

In **vsTASKER**, satellite and orbit editing allows you to seamlessly integrate 6G orbital missions, communication payloads, and space-to-ground assets into a unified scenario. Users can define custom spacecraft, configure orbital parameters, and run high-fidelity dynamic propagators natively without needing secondary software.]

Setting Up and Editing Orbits

You can configure both Earth-observation constellations and deep-space vehicles using specific, interactive parameters:

- **Keplerian Elements**: Define orbital geometry manually using standard parameters like semi-major axis, eccentricity, inclination, RAAN, argument of perigee, and true anomaly.
- **TLE Input**: For quick setup of existing, tracked space objects, vsTASKER accepts two-line element sets (TLEs) directly.
- **Propagators**: Choose between different onboard orbit dynamic modules (like two-body analytical formulas) to track velocity and positioning.

- Ground Tracks & Swath: Visualize where the satellite passes over the Earth in real-time, compute line-of-sight access, and check payload coverage fields.

Simulation and Integration Tools

vsTASKER goes beyond simple orbital visualization by turning the simulated satellite into an active agent in a larger warfare or communications scenario:

Sensors & Link Budget: Compute data consolidation, latency, and inter-satellite network connections (like crosslink tracking).

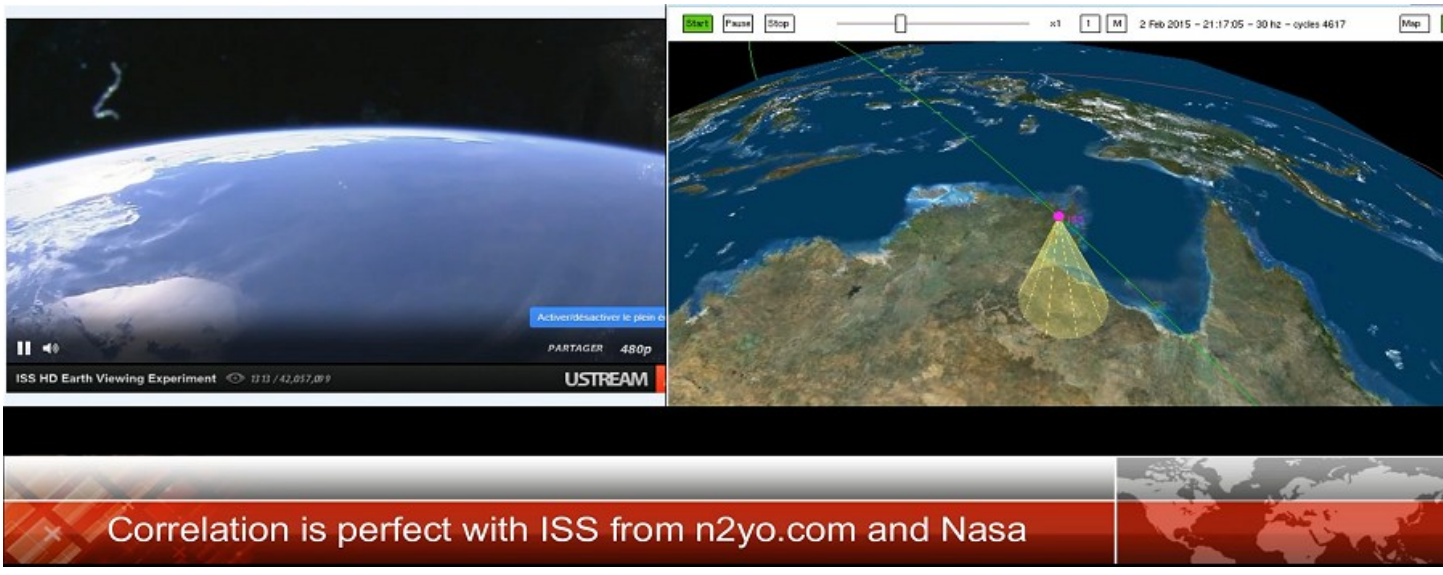
Third-Party Integration: While vsTASKER includes native orbit definitions, it is also fully compatible with high-end space modeling engines like AGI's STK (Satellite Tool Kit) to expand sensor simulation and detailed link budget calculations.

Mission Logic: Implement autonomous responses, such as planning maneuvers based on ground-station signals or adjusting satellite attitude.

If you'd like, let me know:

- What type of mission are you designing (e.g., Earth observation constellation, communication relay, or space debris tracking)?
- Are you looking for specific orbital altitude ranges (e.g., LEO, MEO, GEO)?

I can help you outline the exact parameters or file types you need to import to get started.



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by VirtualSim

vsTASKER includes now orbit definition and propagator to address satellite and spaceships simulations without requiring another product.

Orbits can be defined automatically from TLE description provided by organisms such as NORAD (see here). Once an orbit is defined, a satellite or spaceship can be attached and moved along this orbit using one of the three propagator provided with vsTASKER. If required, user can also define or use its own propagator.

For specific satellites which are not listed by NORAD (military satellites mostly), user can use Kepler parameters to define its own orbits (Geostationary, Molniya…) and move along its own space objects.

With this capability, scenarios can now add satellite communications, ground coverage analysis, satellite to satellite

communications, earth shadowing, sun shadowing, ground to space station visibility, intercontinental missile detection and destruction, satellite weapons, etc.

With this functionality:

- Round earth globe display
- TLE orbit definition with database
- Keplerian orbit for manual definition
- Orbits from low altitude, geostationary to Molniya
- SGP4 propagator
- Two-Body propagator
- J2 propagator
- Julian time in scenario
- Terminator computation

OS & HARDWARE SUPPORT	INDUSTRY APPLICATION

Note: ** Specifications are copied from manufacturer data. Please contact before buying.