



The Conjunction Analysis Tool (CAT) determines time windows in which the launch or operation of a space object is affected by the proximity of another orbiting object.

Unprecedented computation speed

Pre-filtering of orbit elements enable CAT to quickly exclude space objects that cannot possibly have a close approach due to their orbit shape, distance between orbits, and the relative passage times when each object is close to the orbit of the other.

Using pre-filters provides unprecedented computation speed without reducing fidelity by decreasing the number of objects for which STK generates ephemeris data for the final stage of proximity calculation.

Error ellipsoids for close approach analysis

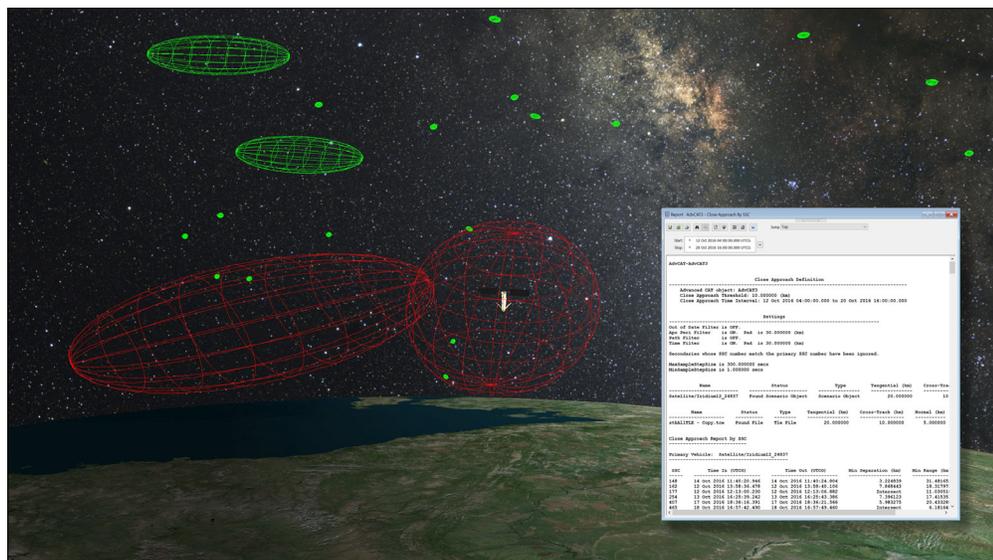
Error ellipsoids (threat volumes) more accurately model the uncertainty in the position of both the desired spacecraft and those that may have potential close approaches.

All secondary objects computed as close approaches with the primary object, as well as the associated close approach time intervals, can be added to STK for further analysis.

Leverages satellite database

CAT ensures the analysis is always up-to-date by taking advantage of the NORAD TLE database of more than 15,000 orbiting objects.

- Perform close-approach or laser-clearing analysis against the entire database in seconds.
- Select portions of the database or create your own.



3D visualization of error volumes

The error ellipsoid for each primary and secondary (those in the Satellite database) are displayed in 3D.

- Error ellipsoids change from green to yellow to red during close approaches.
- Click on any ellipsoid for quick identification and retrieval from the database.

CAT analysis tool options

CAT provides four analysis options:

- Close Approach
- Advanced CAT
- LaserCAT
- Launch Window Analysis

Close Approach tool

Computes close approaches on a single selected satellite, missile, or launch vehicle. This tool is used to define a fixed error ellipsoid (tangential, cross-track and normal components) for the primary object and all of the secondary objects.

Advanced CAT tool

Performs close approach analyses for multiple satellites and datasets at a time with variable threat volume definitions.

Variable threat volume types. Fixed, Orbit Class, Quadratic, Quadratic Orbit Class, Covariance, and CovOffset.

Related objects file. Used to exclude objects that are supposed to be near the primary object(s) from calculation.

SSC hard body radius file. Used to specify the size of objects being analyzed.

Nonlinear probability tool. Used to compute conjunction probability for nonlinear relative motion. It is used to test for linear relative motion and provides two methods for computing conjunction probability - adjoining parallelepipeds (bundles) and adjoining tubes (cylinders).

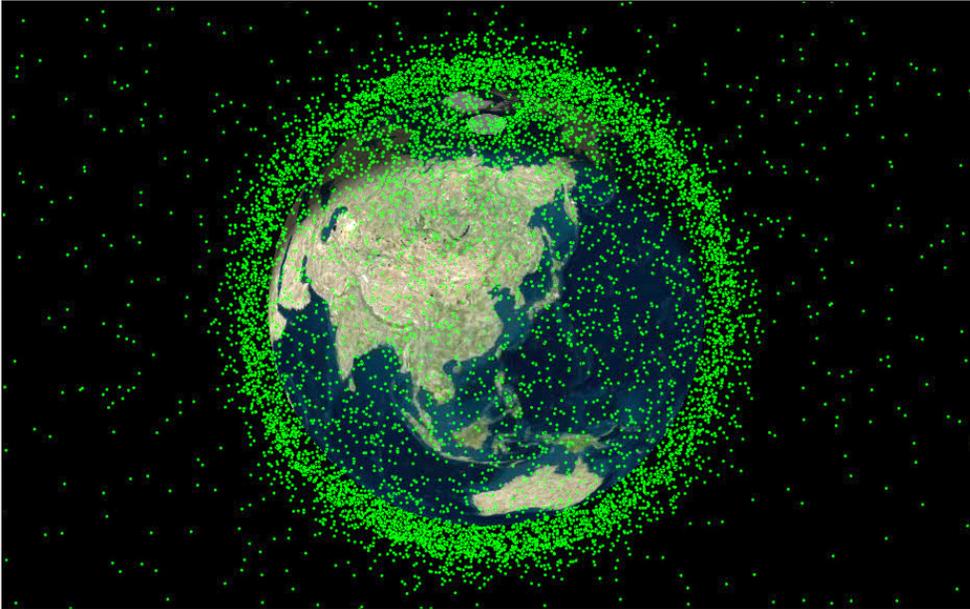
LaserCAT tool

Assesses the potential of an unintended illumination of a satellite during a given laser run or within a lasing window.

Exclusion half-angle. Defines the safety cone used in determining whether your laser operations come too close to other orbiting objects.

At risk file. Speeds computation and enables you to focus your LaserCAT analysis on satellites that are truly vulnerable to inadvertent lasing and ignore other orbiting objects in the database, such as debris and rocket parts.

Potential victims report. Identifies the space objects that will be within the safety



cone around the beam during the operating period of the laser. Each object is clearly identified along with the time periods that it is at risk

Clear firing report. Identifies the time periods when the laser may be used to illuminate the desired object while ensuring that no other space objects have entered the safety cone around the beam.

Launch Window Analysis tool

This tool is used to evaluate an entire launch window for safe and unsafe launch intervals.

Reports and graphs. Blackouts and Clear Intervals.

Graphics options. Launch Area, Blackout Track, Clear Interval Tracks, and Minimum Range Tracks.