ODTK

AGI
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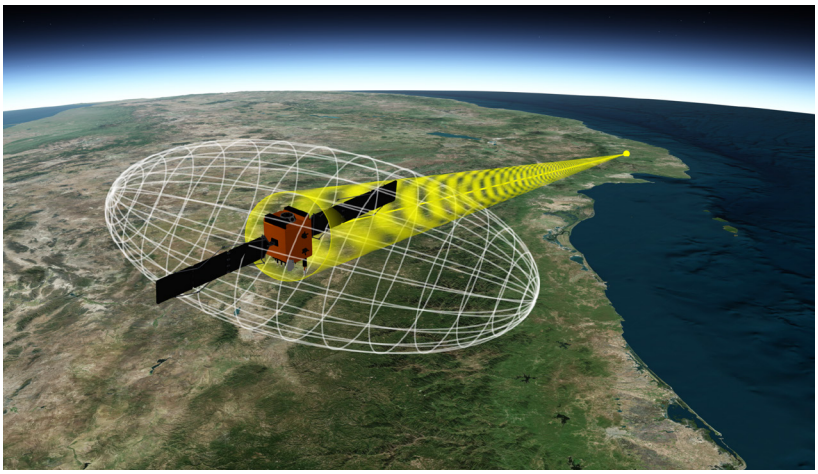
Operationally proven spacecraft navigation software.

Orbit Determination Tool Kit (ODTK) provides highly accurate orbit estimates throughout the engineering life cycle, from mission design through operations. Run pre-flight simulations to evaluate proposed tracking methodologies, reducing costs and optimizing resources while ensuring that mission requirements are met. Visualize your results in customized output products, using the embedded reporting and graphing capability. Meet your most stringent mission requirements with ODTK's state-of-the-art optimal sequential filter and matched smoother. Use ODTK's automated interface to simplify your operator workflows or integrate into larger systems. For over 15 years, ODTK has been the industry's trusted solution for orbit determination software.



Use Cases

- Support early phase mission design and planning, trade studies, proposals, or internal research.
- Simulate predicted orbit accuracies for a proposed mission to ensure that it is flyable.
- Process spacecraft tracking data to navigate accurately and confidently on live missions.
- Integrate into a flight dynamics system for hands-on or lights-out operations.
- Support landing operations on other bodies, such as the Moon or Mars.
- Geolocate ground emitters.
- Containerize for deployment to the cloud.

Key Value Points

- Provides over 100 unique measurement models.
- Strong operational legacy.
- Applicable to any orbit regime, from LEO to deep space.
- Can estimate across multiple maneuvers and compute corrections to thrust and direction.
- Produces realistic ephemeris covariance.
- Supports simultaneous orbit determination on multiple objects in the same solution.
- Easy to integrate into larger systems or extend with more detailed models.

Core Capabilities

- **Optimal sequential estimation**. Automate data editing, generation of ephemeris including realistic covariance, and quality assurance information sensitive to measurements and system dynamics.
- **Tracking data simulation**. Evaluate proposed tracking methodologies and schedules with respect to mission requirements. ODTK supports integrated system testing including the effects of anomalies in the tracking data.
- **Initial orbit determination (IOD) methods**: Gooding Angles Only, Herrick-Gibbs, GNSS navigation solution, and Geosynchronous – to determine the initial state of a satellite.
- **Analysis capabilities**. Includes a wide variety of data elements and pre-defined styles for reporting and graphing. You can also use custom styles for graphs and Python based report styles, for near limitless customization. Export output data as text or CSV files to easily import into other analysis tools. Load ODTK results into Systems Tool Kit (STK) for further analysis.
- **Robust, well-documented API**. Automate processing in support of large parametric or Monte-Carlo analyses, simplified operator workflows, and lights-out operations. You can use the Component Object Model (COM) or cross-platform support of MATLAB, Python, and C++ integration on Windows and Linux.

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Technical Details

Measurement types

- Ground-based, relay-based, and space-based tracking
- Multi-GNSS support including pseudo-range and carrier phase
- Deep Space Network, including DDOR
- Optical navigation
- Geolocation observations/TDOA/FDOA
- Accelerometer

Estimation states

- Orbit, force model parameters, thrust correction: multi-satellites and multiple maneuvers
- Tracking system biases, station and GNSS receiver clocks, transponder delay, antenna offsets
- Facility location, troposphere corrections

High fidelity dynamical models

- From the Sun to Mars
- Unlimited size gravity-potential model, solid and ocean tide models, third-body perturbations
- Atmospheric drag with multiple shape and density model selections, plus plugin extensibility
- Solar pressure with multiple shape model selections, plus plugin extensibility
- Impulsive and finite, including low-thrust, maneuver models
- Plug-in point for additional customized modeling

Learn more
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