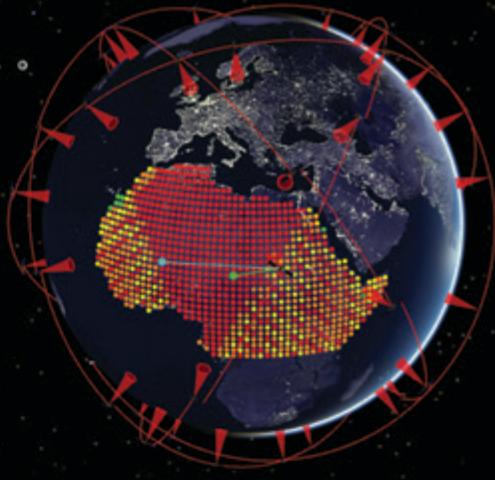


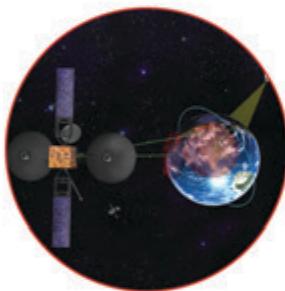


Leverage the power and flexibility of FreeFlyer® astrodynamics software in your next mission.



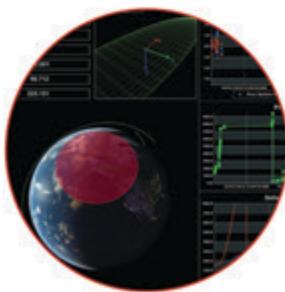
SOFTWARE FOR SPACE MISSION DESIGN, ANALYSIS, AND OPERATIONS

FreeFlyer® provides complete astrodynamics functionality for missions of any size, any scale, any orbit regime, ITAR-Free. With heritage on over 200 missions, customizable interfaces, and easy integration into modern ground systems architectures, FreeFlyer supports the full life cycle of your mission.



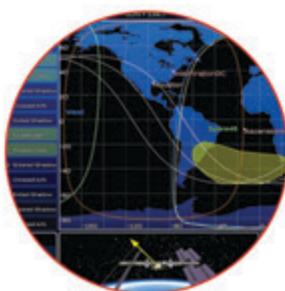
DESIGN

Design satellite orbits in any regime, define constellation parameters, target maneuvers, and simulate the full mission life cycle from launch to nominal operations to disposal.



ANALYSIS

Analyze any mission requirements, including spacecraft and ground sensor coverages. Generate fuel consumption reports and perform parametric trade studies. Augment FreeFlyer's internal algorithms with user-defined math functions and custom computations, or use the native MATLAB API.



OPERATIONS

Automate satellite operations for both routine and complex flight dynamics tasks. Integrate with ground system databases, 3rd-party TT&C software, and legacy code via the FreeFlyer Runtime API on both Windows and Linux with interfaces for C/C++, C#, Java, & Python.

AT A GLANCE

CORE FUNCTIONALITY

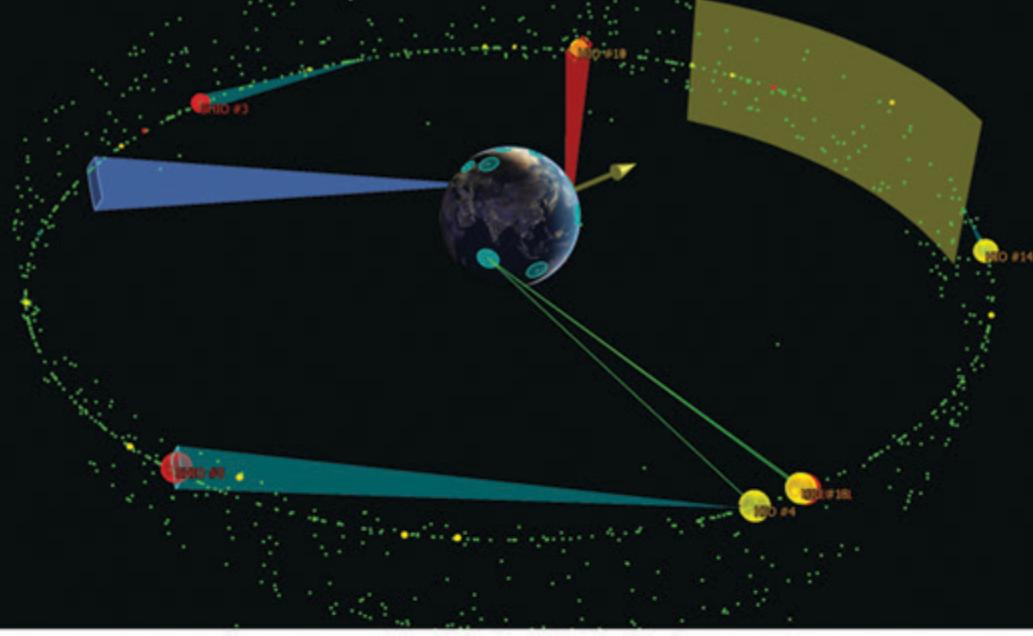
- Spacecraft Propagation
- Coverage & Contact Analysis
- Maneuver Modeling & Targeting
- Orbit Determination
- Attitude Modeling
- Terrain Analysis
- Custom Algorithms
- Flexible Integration

HERITAGE

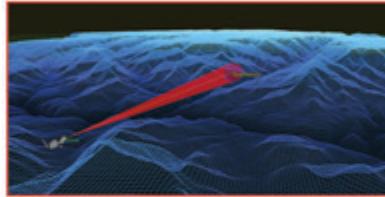
- NASA Science Missions
- USSF/USAF Programs
- NOAA Science Missions
- International Space Station
- NASA Orion & Gateway
- Commercial Satellite & Constellations (U.S. and Abroad)

OPERATIONALLY PROVEN FOR

- Space Domain Awareness
- Orbital Debris/Collision Avoidance
- Ground System Integration
- Automated Operations
- Mission Design & Analysis
- Wargame Strategies
- Constellations & Clusters



FreeFlyer® is a commercial off-the-shelf (COTS) software application for space mission design, analysis, and operations. FreeFlyer stands out as the most powerful tool of its kind by providing users with a robust scripting language for solving all types of astrodynamics problems. FreeFlyer has been validated, flight-tested, and proven accurate. It is used for spacecraft analysis and operations by NASA, NOAA, USAF, USSF, IC, commercial, and international satellite providers.



Experience our multi-domain operations capabilities for space and missile defense.



Custom visualizations bring situational awareness to your mission controllers.

FREEFLYER FEATURES

Generating Output

- Customizable 2D and 3D visualizations of your mission
- Fully tailorable cartesian and polar plots of any mission parameters
- Data can be reported to consoles, tables, or exported via custom reports

FreeFlyer Scripting

- Scripting gives you full control over the inputs, outputs, and logical flow of an astrodynamical simulation
- Development and execution environment includes auto-complete, syntax highlighting, and smart indentation
- Native interfaces with MATLAB® and TCP/IP sockets

Flexible Integration

- Custom force modeling and custom object definitions via FreeFlyer Extensions*
- Runtime API for use with C/C++, C#, Java, MATLAB®, and Python applications*
- Interfaces with ODBC databases created in MySQL®, Microsoft Access®, Oracle®, and more*

Support

- Free upgrades to newer versions of FreeFlyer
- New user training session included for free
- No-cost license transfers to new machines
- FreeFlyer Technical Support team via email or phone

Architecture

- Node-Locked, Dongle, and Network licensing options
- 6 instances with each license for parallel processing
- Deployable to cloud and VM-based architectures
- Available in two tiers of functionality

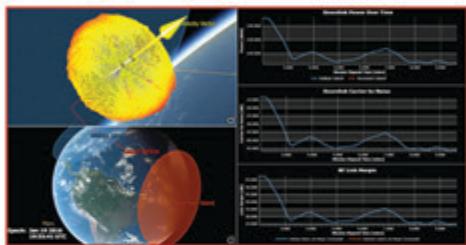
FREEFLYER CAPABILITIES

Spacecraft Propagation

- Propagate using numerous integrators and ephemeris types for single spacecraft, clusters, and constellations
- Full force modeling capability includes multi-body gravitational acceleration, atmospheric drag and lift, and solar radiation pressure

Coverage and Contact

- Hundreds of pre-defined ground stations with accurate masking profiles, or customize your own
- Easily gather visibility, az/el, range/range rate, in/cross/along track, and coverage/revisit statistics



RF Link Object for two-way communications with 3D visualization of antenna gain pattern

Attitude Modeling

- Load 3D models and define movement of individual spacecraft elements like solar panels
- Propagate attitude for precise contact, maneuvering, and slew planning
- Fully customizable attitude motion model and coordinate systems for slew planning

Maneuvering and Targeting

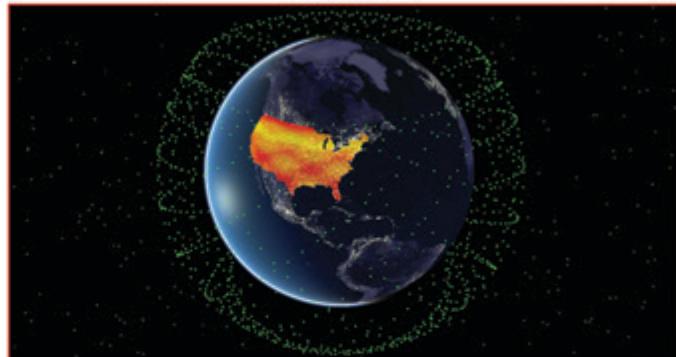
- Support for impulsive and finite burn modeling of high thrust and low thrust events
- Modeling for electric and chemical systems
- Built-in multi-variable targeting tool with differential corrector capability

Interplanetary

- Support for a multitude of standard reference frames for Earth, Moon, Mars and other solar system bodies
- Define custom celestial objects to represent asteroids, moons, or other gravitational bodies
- B-plane analysis, rotating libration point, and rotating-pulsating system support

CA/SSA Applications

- Built-in methods for Time of Closest Approach (TCA), Probability of Collision (Pc), and Miss Distance
- Collision avoidance maneuver planning
- Model rendezvous and proximity operations, including BMC2 scenarios



FreeFlyer easily scales to analyze constellations of any size

Orbit Determination*

- Extended and unscented Kalman filters, batch least squares, and square root information filter methods for orbit determination solutions
- Spacecraft state estimation with receiver and transponder modeling and covariance propagation
- Ground-based, GPS point solution, space-based, TDRS, and BRTS tracking data options supported



FreeFlyer used in the ISS NASA Mission Control Center (Houston, TX)

Terrain Analysis*

- Compatible with public and restricted access data in many formats and resolutions
- Load global terrain or a local region of interest
- Compute visibility between any combination of assets

* Note: Orbit Determination, Terrain Analysis, and certain Integration capabilities are only available with FreeFlyer Mission tier.



NOTABLE SUPPORTED MISSIONS



Solar Dynamics Observatory

MMS



Classified Missions



GPS Constellation



International Space Station

Comm/ISR/GPS Coverage



Libration Point
Deep Space Missions
Interplanetary Transfers

BEO



Lunar Gateway



James Webb Space Telescope

NOAA GOES Fleet



Communications
Space Situational Awareness

GEO

GPS Orbit Determination
Highly Elliptical Orbits

MEO



Earth Observation
Earth Science Missions
Commercial Constellations

LEO



NASA Earth Observing System



SNC Dream Chaser

Warfighter Support
Terrain Analysis

GND



Landsat 7, 8, 9

Contact us at sales@ai-solutions.com for a free evaluation and a customized demonstration to see what FreeFlyer® can do for your mission.