GMAT Wiki Home

The GMAT development team is pleased to announce the release of GMAT version R2018a The binaries are available here. New features in this release include orbit determination improvements, a built-in non-linear optimizer, and numerous bite-sized enhancements. For a complete list of new features, compatibility changes, and bug fixes, see the Release Notes

Here is some exciting recent news:

- GMAT is now used as the primary system for maneuver planning and product generation for the Solar Dynamics Observatory (SDO).
- GMAT is now used as the primary operational tool for orbit determination for the Solar and Heliospheric Observatory (SOHO) mission.
- GMAT is now used as the primary operational tool for maneuver planning, orbit determination, and product generation for the Advanced Composition Explorer (ACE) mission and the Wind mission.
- In April 2018, the Transiting Exoplanet Survey Satellite (TESS) mission launched. TESS is the first mission to use GMAT as its primary tool for mission design and maneuver planning from proposal development through operations.
- In May 2018, GMAT passed an Operational Readiness Review (ORR) for the Lunar Reconnaissance Orbiter (LRO) for Orbit Determination (OD) and is currently being transitioned to the prime system for LRO OD replacing the Goddard Trajectory Determination System (GTDS).

Do you want to go to Mars but don't know when to leave or how much to bring?   Do you want to land something on the moon? The General Mission Analysis Tool (GMAT) is an open-source space mission analysis tool to answer just those types of questions. GMAT is developed by a team of NASA, private industry, public, and private contributors. GMAT is intended both for real-world engineering design studies and as a tool for education and public engagement in the spirit of the NASA Charter.

This wiki contains many resources for GMAT users and developers. It is intended for collaboration! If you see anything wrong with any of the pages on this wiki, or wish to add GMAT-related information on your own, please feel free to contribute.

GMAT and Space Mission Design

GMAT is designed to model, optimize, and estimate spacecraft trajectories in flight regimes ranging from low Earth orbit to lunar applications, interplanetary trajectories, and other deep space missions. Analysts model space missions in GMAT by first creating resources such as spacecraft, propagators, estimators, and optimizers.

Resources can be configured to meet the needs of specific applications and missions. GMAT contains an extensive set of available Resources that can be broken down into physical model Resources and analysis model Resources. Physical Resources include spacecraft, thruster, tank, ground station, formation, impulsive burn, finite burn, planet, comet, asteroid, moon, barycenter, libration point. Analysis model Resources include differential corrector, propagator, optimizer ,estimator*, 3-D graphic, x-y plot, report file, ephemeris file, user-defined variable, array, and string, coordinate system, custom subroutine, MATLAB function, and data.

Below we illustrate some recent applications using GMAT.   A solution is shown that uses a low thrust propulsion system and a cube-sat for a lunar mission.