

About the Library

AstDyn (Asteroid Dynamics) is a high-fidelity C++ library designed for the precise orbit determination and propagation of celestial bodies, specifically focusing on Main Belt asteroids and Near-Earth Objects (NEOs).

Developed within the **ITALOccult project**, this software represents the state-of-the-art in computational astrodynamics, aimed at reducing ephemeris uncertainties to sub-milliarcsecond levels for accurate stellar occultation predictions.

Key Features:

- **Rigorous Dynamics:** Relativistic models (EIH) & JPL DE441 perturbations.
- **High-Order Integration:** Adaptive Runge-Kutta-Fehlberg 7/8 (RKF78).
- **Precision:** Validated against NASA/JPL Horizons ($\pm 2\text{m}$ accuracy).
- **Comprehensive Tools:** From coordinate transformations (IAU 2006) to differential correction.

This manual serves as the definitive reference for researchers, astronomers, and software engineers.

ITALOccult Project
Open Source Scientific Software
C++ / Space Science / Astrodynamics



AstDyn

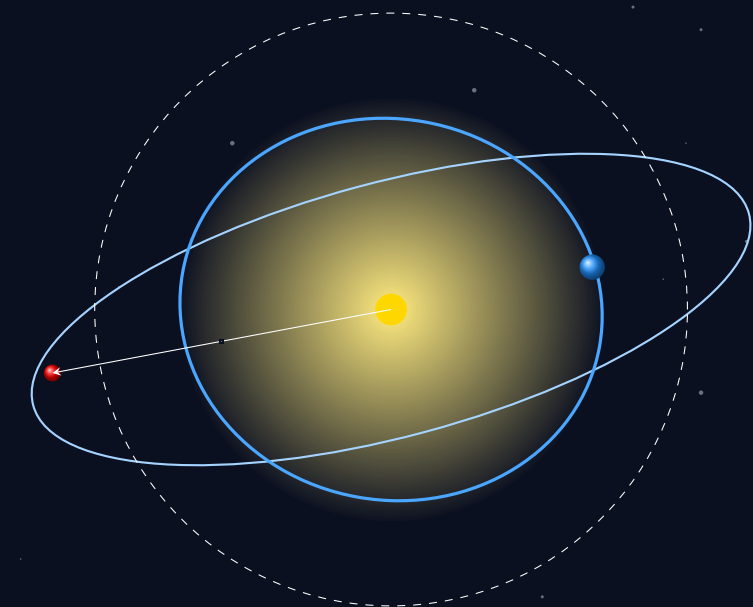
Scientific Reference Manual

Michele Bigi

AstDyn

Scientific Reference Manual of the C++ Library

*The ITALOccult Framework for High-Precision
Asteroid Dynamics & Occultation Prediction*



Michele Bigi