## 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 (±2m accuracy).
- **Comprehensive Tools**: From coordinate transformations (IAU 2006) to differential correction.

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

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

AstDyn

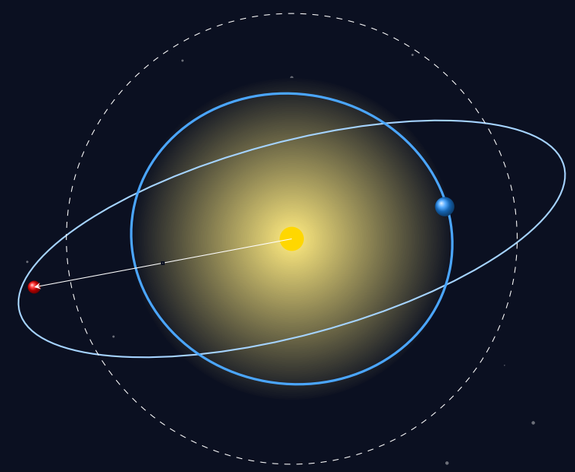
Scientific Reference Manual

Michele Bigi

# AstDyn

## Scientific Reference Manual
### of the C++ Library

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



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