

Bachelor / Master Thesis

Evaluation and implementation of attitude propagation within an orbital propagator

YOUR MISSION:

The OKAPI:Orbits' cloud based backend to propagate orbital motion relies on the orbital propagator NEPTUNE (NPI Ephemeris Propagation Tool with Uncertainty Extrapolation) for highly accurate orbit extrapolation. NEPTUNE has been developed to be used in the Space Situational Awareness context. It is used on orbit determination, re-entry prediction and conjunction analysis services.

The aim in this thesis is to extend the ability of the 3-DOF propagator to support attitude motion. Currently, NEPTUNE assumes space objects to be point masses with a spherical shape. It propagates its position and velocity vector over time. In this work the geometrical shape of the objects shall be definable and its attitude shall also be propagated. In turn the propagation needs to take into account the moments of inertia in the propagation. Within this thesis the following work should be performed:

- The theoretical work necessary to describe the attitude of a space object has to be worked out. This includes research into
 - the necessary equations, as well as
 - the data needed to describe the object.
- An implementation of the approach within NEPTUNE (Fortran-2008).
- Validation of the work based on known objects in space and other freely available propagators.

YOUR PROFILE:

- Study of Aerospace Engineering, physics or anything related,
- Practical programming experience using compiled programming languages,
- Experience in using and adapting numerical integration methods,
- Basic knowledge of orbital mechanics.

YOUR BENEFITS:

- Team of motivated entrepreneurial colleagues and experts in the space domain
- Fair payment
- Free coffee, lunch routines and fun office events

ABOUT US:

OKAPI:Orbits is a young start-up developing an innovative AI-based platform for automated collision avoidance of satellites. We value entrepreneurial-minded, creative people, who are willing to take responsibilities to actively contribute to the development of OKAPI:Orbits and its products.

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