

**Title**

*Orbit determination based on sun sensor and magnetometer for nanosatellite applications*

**Author**

Ricardo Colpari

**Abstract**

Increasing capabilities of nanosatellite (1Kg to 10Kg) applications in Low Earth Orbit (LEO) demand robust and reliable methods for orbit determination, typical implementations such as SGP4 propagators may result in significant errors over long periods of time, while using a GNSS receiver on board can result in more precise positioning of the satellite, the small volume, mass restriction and low power budget of a nanosatellite platform often make the implementation of a GNSS receiver unfeasible. Another alternative is the method described in this work, it uses the data collected from two sensors for attitude determination in an algorithm based on an Extended Kalman Filter (EKF), the measurements are from the magnetometer and sun sensors which are found in every nanosatellite platform. The algorithm is tested with simulations using the CelestLab library for space mechanics in the Scilab environment; the results show that this method may serve as a complementary orbit determination system to the standard use of TLE sets and SGP4 propagation to increase reliability in nanosatellite missions.