

SYMPOSIUM ON FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS (A7)
Science Goals and Drivers for Future Exoplanet, Space Astronomy, Physics, and Outer Solar System
Science Missions (2)

Author: Dr. Roberto Peron
INAF-IAPS, Italy

Prof. Enrico C. Lorenzini
Università degli Studi di Padova, Italy

METRIC: A DEDICATED EARTH-ORBITING SPACECRAFT FOR FUNDAMENTAL PHYSICS AND
GEOPHYSICS

Abstract

A dedicated mission in low Earth orbit — called METRIC — is proposed to test selected predictions of gravitational interaction theories and to directly measure the atmospheric density in the covered altitude range, at the same time providing a metrological platform able to perform a tie between different space geodesy techniques. The core of the mission would be a rather simple spacecraft placed in a highly eccentric orbit between 450 and 1200 km; it should be tracked from ground with high precision, and an on-board accelerometer would measure the non-gravitational accelerations acting on it. A precise orbit determination is expected to provide estimates of fundamental physics and geophysical parameters, while the accelerometer data are fundamental in constraining the atmospheric density. Along with the mission scientific objectives, a possible baseline for spacecraft configuration and data analysis is described and discussed.