Global lunar gravity field recovery for SELENE (I)

Wencke van der Meulen[1], Koji Matsumoto[2], Kosuke Heki[3]

[1] Aerospace Engineering, DUT(now at NAO), [2] Div. Earth Rotation, Natl. Astronomical Obs., [3] Div.Earth Rotation, National Astron. Obs.

A feasibility study is presented of high resolution and high accuracy determination of the fully global lunar gravitational field from the SELonological and Engineering Explorer (SELENE) gravity field experiment. Global mapping of the fine details of the gravitational field is achieved by means of satellite-to-satellite tracking of the orbiter injected in a polar orbit at 100 km. The long wavelength gravitational features are obtained by Earth-based tracking of the orbiter and the relay satellite with altitude of 100-2400 km. Hence, the combination of SST measurements and conventional Earth-based tracking provides a sophisticated tool to measure a wide range of harmonic frequencies.

A feasibility study is presented of high resolution and high accuracy determination of the fully global lunar gravitational field from the SELonological and Engineering Explorer (SELENE) gravity field experiment. SELENE a joint project of the National Space Development Agency of Japan (NASDA) and the Institue of Space and Astronautical Science (ISAS) is planned to obtain global characterisation of the Moon. Global mapping of the fine details of the gravitational field is achieved by means of satellite-to-satellite tracking of the orbiter injected in a polar orbit at 100 km. The long wavelength gravitational features are obtained by Earth-based tracking of the orbiter and the relay satellite. The latter is deployed in an eccentric polar orbit with an altitude range of 100-2400 km. As the orbit of the orbiter is highly perturbed by the gravitational field, it is expected that the orbiter will require intensive orbit maintenance in order to meet the altitude envelope requirements. Therefore, the relay satellite which will freely orbit in space, is more suitable to estimate the longwavelength gravitational features. Hence, the combination of SST measurements and conventional Earth-based tracking provides a sophisticated tool to measure a wide range of harmonic frequencies.