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Towards Future Gravity Missions - Results of a Three-Years Feasibility Study in Japan –

YOICHI FUKUDA[1], SHUHEI OKUBO[2], TOSHIMICHI OTSUBO[3] and HIROO KUNIMORI[4]

[1]*Department of Geophysics, Kyoto University,E-mail:fukuda@kugi.kyoto-u.ac.jp*
[2]*Earthquake Research Institute, University of Tokyo, E-mail: okubo@eri.u-tokyo.ac.jp*
[3]*Kashima Space Research Center ,NICT,E-mail:otsubo@nict.go.jp*
[4]*Optical Space Communication Group, NICT, E-mail: kuni@nict.go.jp*

As a 3 years project (FY2002-2004) funded by MEXT (Ministry of Education, Culture, Sports, Science and Technology) of Japan, we have conducted feasibility studies regarding future satellite gravity missions, in particular, a SSI (Satellite to Satellite Interferometer) mission. As is well known, the GRACE mission realized a new technique to measure very small gravity fluctuation using satellites. It revealed seasonal variation of surface water and/or land water in Amazon, ice sheet mass changes in Greenland, and so on. However, GRACE which employs a microwave link for SST (satellite to satellite tracking) is still unsatisfactory in its sensitivities for monitoring regional to local scale phenomena. Thus we aim future application of a SSI (Satellite to Satellite Interferometer) mission to improve the sensitivities and spatial and temporal resolutions consequently. In the project, we carried out some basic experiments/ developments; (1) development of new precise orbit determination software, (2) studies of laser interferometer techniques by a newly developed ground simulator, (3) development of a newly designed 3-axis accelerometer and its performance test on ground. We also carried out some simulations for the further application of these techniques, and aim to propose a basic design of a future gravity mission. .