A NEW PROJECT OF GRAVITY MISSION STUDIES IN JAPAN

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We have started a new project of GPS occultation and satellite gravity mission studies in Japan. This project, which is funded by MEXT (Ministry of Education, Culture, Sports, Science and Technology) for a 3 years project (FY2002-2004), primarily aims at developing a calibration free satellite observation system for monitoring the Earth's environmental changes related to global warming. For this purpose, we try to employ two different but closely related techniques of GPS occultation and Satellite Gravity Mission, and we organized two study groups accordingly. The first group led by Toshitaka Tsuda of Kyoto University, who is also the leader of the project, devotes the GPS occultation, and the second group led by Yoichi Fukuda devotes the gravity mission studies. In this paper, we briefly introduce the project plan of the gravity mission studies in particular.

It is quite a new technique to monitor the Earth's environment, for instance, global water cycling, by measuring very small gravity fluctuation using satellites. The idea is successfully coming true by the GRACE mission. However, GRACE employs a microwave link for SST (satellite to satellite tracking) and its sensitivities and spatial resolution are still unsatisfactory for the monitoring of regional 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 this project, as feasibility studies, we carry 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 carry out some simulations for the further application of these techniques, and aim to propose a basic design of a future gravity mission.