Development of gravity gradiometer for the interior investigation of the solar system small body

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In order to elucidate the processes of water transport in the early solar system, the interior structure of the solar system small body need to be resolved. The gravity field investigation is an effective measure for the interior structure exploration, because the gravity depends not only on the surface topography but also the internal density variation.
For this purpose, we are developing a new type of spaceborne gravity gradiometer (GGM) which enables fine spatial resolution of the microgravity measurement. We take advantages of previously developed accelerometer for the observation at LEO by Araya of Earthquake Research Institute of the University of Tokyo (ERI). On the basis of design of terrestrial GGM to be used at ocean bottoms, Araya's accelerometer adopts magnetic actuators, not electrostatic actuators which are commonly used for the gravity measurement by Earth orbiting satellites. To test and evaluate our new instrument and basic technology, we plan a drop tower experiment by GGM at the end of FY2020.
In this presentation, we show the performance evaluation results of the test model for translation and rotation acceleration measurements and its feasibility of the microgravity measurement in the future space mission.

Keywords: gravity gradiometer, solar system small body, internal structure exploration

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