

Development of an in-site rock observation system onboard the next lunar landing mission SELENE-2

Chikatoshi Honda^{1*}, Makiko Ohtake², Hisashi Ootake², Katsushi Furutani³, Masatsugu Otsuki², Kazuto Saiki⁴, Tomokatsu Morota⁵, Takamitsu Sugihara⁶

¹University of Aizu, ²Japan Aerospace and Exploration Agency, ³Toyota Technological Institute, ⁴Osaka University, ⁵Nagoya University, ⁶Japan Agency for Marine-Science and Technology

Compositional information of the lunar and planetary surface is important for understanding the bulk composition and evolution of the lunar and planetary bodies. For example, the information of the lunar highland could help us to know the solidification of the lunar magma ocean and to estimate the internal structure of the Moon. Previous studies had been done by using the lunar returned samples which have bias composition, so, it is important to select samples for well-understanding of more primitive highland materials by an in-situ observation.

We are now planning to develop a visible-SWIR macro camera with rock abrasion tool (RAT) which is required to establish a light-weighting for setting on a head of rover's arm. The RAT system will be required to observe the rock sample's texture and composition. An important issue is to grind the surface of rock under vacuum condition. We examined to make a grind test which was done to grind an anorthosite rock sample under a very low pressure of atmosphere by using a RAT developed by HONEY-BEE ROBOTICS. As a result, we could confirm to be able to grind the rock sample with very low preload (< 5 N), however, additional bit development work is required to increase the bit life margin (more than 10 grinds). We'll report the details of the examinations about the RAT system, optical design of a visible-SWIR macro camera, and a dark current test of a visible-InGaAs sensor.

Keywords: visible-SWIR macro camera, rock abrasion tool