Objective and Current Development Status of Multi-Band Camera on SLIM

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Smart Lander for Investigating Moon (SLIM) project is on going in JAXA. The main objective of this project is to demonstrate various techniques for “pin-point landing” on the moon. SLIM spacecraft is a small lander. It is designed to achieve “pin-point landing” to 100 meter-order error circle. In order to “pin-point landing” of this level, SLIM mission will demonstrate new image-based onboard navigation system and autonomous landing along with several other new technologies (e.g. “tow stage” landing sequence, metal shock absorbers). The SLIM spacecraft weight is ~730 kg wet mass and ~200 kg class dry mass, both of which are more lightweight than previous lunar landers. The spacecraft will be launched with a Japanese rocket H-IIA in 2021 or 2022. Landing on (25.2ºE, 13.3ºS) located in the west of Mare Nectaris is planned.

After landing, SLIM project is planning to observe around landing site using Multi-Band Camera (MBC). The observational mission is positioned as extra success. MBC will observe olivine and estimate Mg# of it. MBC is a compact VIS-NIR camera composed of an imaging sensor (InGaAs), a filter-wheel with 10 band-pass filters, a telephoto optical system, and a movable mirror for panning and tilting. The sensor has sensitivity at wavelength from 700 to 1700 nm, which covers the characteristic ab-sorption bands of lunar minerals. The telephoto optical system can focus on an object from 1.5 to 30 m distance. The imaging sensor has 640 ×512 pixels with 20 μm pitch. The 4º field of view corresponds to the spatial sampling of 1.3 mm per pixel at 10 m from the lander. Using the movable mirror, observable scanning area is ~50º in azimuth and ~70º in elevation. This makes it possible to observe the size distribution of boulders around the lander. The observation wavelength of band pass filters were selected 10 bands: 750, 920, 950, 970, 1000, 1050, 1100, 1250, 1550, and 1650 nm. The width of their bands is 30nm.

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