

## Utilization of Ground-based Observation of the Moon to Support KAGUYA (SELENE) Science Research

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Three types of hyperspectral telescope had been developed. This presentation introduces their results supporting for SELENE (KAGUYA) LISM results and operation and discuss the future application supporting LISM science. The first telescope is Advanced Lunar Imaging Spectrometer (ALIS), the second one is Tunable Liquid-crystal Telescope (TLT), and the third one is Near Infra-Red multi-band Telescope (NIRT). They apply different dispersive elements. ALIS uses PGP (Prism-Grating-Prism) devices covering 380 - 1700 nm. It is a Cassegrain telescope equipped with two spectrometers; Visible (VIS) one and Near Infrared (NIR) one. Each spectrometer is composed of an imaging sensor and a PGP unit. The spectrometers capture "1-line spatial information" x "wavelength information" image at one shot. Line images are assembled by scanning an image on a slit of the spectrometer using a rotating mirror. TLT is a multi-band telescope using a tunable liquid-crystal filter covering 650 - 1100 nm. It is a refracting telescope equipped with a cooling CCD camera and a tunable liquid-crystal filter covering 650 - 1100 nm. NIRT is a multi-band telescope using 1250 and 1550 nm bandpass filters. It is also a refracting telescope but equipped with a cooling CMOS camera. Based on the ground-based observations of the moon with these telescope, ALIS succeeded in detecting the shift of the wavelength of Fe<sup>2+</sup> absorption band at around 1000 nm in lunar mare region and indicates the appropriate site for KAGUYA spectrometer and TLT and NIRT succeeded in gaining a lunar absolute radiance and reflectance and proposed a new set of photometric functions. A part of the results are open to public at our web site MoonBaseOsaka (<http://astrosis.ess.sci.osaka-u.ac.jp/MBO.html>).