# Results of Flight Model Tests of Lunar Imager/SpectroMeter

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The SELenological and ENgineering Explorer (SELENE) mission is planned to launch in 2005 as the first full-scale lunar mission since the Apollo missions. The purpose of the explorer is to acquire information to understand the origin and evolution of the Moon and to investigate the possible utilization of the Moon. The Lunar Imager / SpectroMeter (LISM) is an optical instrument package installed on SELENE and consists of three sub-instruments. The Terrain Camera (TC) is a panchromatic stereo camera with two slant optical heads. The Multiband Imager (MI) has five bands in the visible range and four bands in the near-infrared range. The Spectral Profiler (SP) acquires continuous spectra of sun light reflection from the Moon's surface. Since SELENE is a polar orbiter of the Moon, LISM will provide global data for the Moon's surface.

The data of LISM is expected to have higher spatial resolution. The TC acquires global images of the Moon's surface with a spatial resolution of 10 m/pixel and global digital elevation models (DEMs) of height resolutions of 20 to 30 m. Most data of Lunar Orbiters that were lunar global imagers in the 1960s had a spatial resolution of 30 to 100m for the lunar near side and 100 to 300m for the lunar far side. Since past lunar missions have acquired few DEMs, TC DEMs will be valuable to Moon science and the investigation of potential Moon utilization. MI's spatial resolutions are 20m/pixel for visible bands and 60m/pixel for near-infrared bands and are one order of magnitude higher than those of UVVIS and NIR on Clementine. The color ratio images acquired by the MI will provide detailed information of small but geologically interesting areas such as crater walls, crater central peaks and dark mantle deposit areas. SP is a line profiler with a width of 500m on the Moon. The interval of observed lines will be a few kilometers on the Moon's surface near the equator and be narrower for the higher latitude regions. The SP will give us data to identify material types on small areas of the Moon.

LISM is currently in the Flight Model (FM) fabrication and test phases. The fabrication based on the FM design has almost been finished with various tests such as the electro-magnetic compatibility (EMC) test, optical performance tests, and the thermal vacuum tests to confirm the high performance of LISM and its tolerance to the severe environments at launch and in space. The EMC test checks the levels of radiation emissions, magnetic field and so on from LISM. For the SELENE mission, radiation emissions from each instrument should be strictly controlled to less than -30dBuV/m around the frequency of Lunar Radar Sounder (LRS) of 5MHz to ensure sensitive observation by LRS. The primary parameters evaluated in optical performance tests are the signal-to-noise ratios and the linearity of digital numbers to brightness, which are necessary for geological studies with solar light reflection from the Moon's surface. The LISM will be subjected to vibration tests simulating the H-IIA rocket launch conditions and the thermal vacuum condition tests to confirm its tolerance to the repetition of day and night conditions around the Moon. The FM of LISM will be integrated into the spacecraft. Following this, the telemetry and command interface with the bus system of SELENE will be checked, and the cross talk with other components will be evaluated. SELENE has fifteen mission instruments, so the integrated test should be conducted in detail.

In this conference, we will present the development status and discuss the possibility of achieving the expected high performance of LISM.