

The current status of Muses-C AMICA (Asteroid Multiband Imaging CAmera) and its observation scenario

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The first Japanese asteroid mission, Muses-C, is a technology demonstration one to a near-Earth asteroid. The new technological items to be proved in this mission are interplanetary ion-engine performance, autonomous spacecraft control, sampling at the low-gravity asteroid surface, and high-speed Earth reentry.

On the scientific aspect of the mission, it is expected to collect surface materials of the target S-type asteroid, 1998SF36, and obtain geological and geomorphological information. Other scientific observations such as detail near-infrared spectroscopy and chemical analysis by the X-ray fluorescence spectrometer are also carried out.

The multiband imaging camera of Muses-C is a part of the spacecraft's optical navigation cameras. The telescopic camera (ONC-T) with seven-band filters and four polarizers is called AMICA (Asteroid Multiband Imaging CAmera) when ONC-T is used for scientific observations.

The AMICA bandpass filters are nearly equivalent to the seven filters of the ECAS (Eight Color Asteroid Survey) system which has been applied to ground-based asteroid spectroscopy for many years. Obtained spectroscopic data will be easily compared with previously obtained ECAS asteroid data. For this purpose, we listed the bright stars for AMICA observation standard.

AMICA also has four polarizers, which are located on one edge of the CCD chip (covering 200 x 200 pixels each). Using the polarizers of AMICA, we can obtain polarimetric information of the target asteroid's surface.

When the Muses-C spacecraft reach 1998SF36, it stays at home-position just outside the asteroid's effective gravitational field. At the home-position, we will obtain the basic information such as shape, volume, surface morphology, spectroscopy and polarimetry of the target asteroid. For observation items which require high phase-angle condition, the observation stage that the spacecraft moves near the asteroid's terminator zone, is also planned.

During 2000 to 2001, we examined and fixed the AMICA specifications, and tested its basic performances using the prototype model (e.g. Saito et al. 2002). Since 2002, we have been testing AMICA flight model (FM) at the Muses-C integration test, and evaluating the final performance information such as response, dark current, flatfield, distortion, etc. During the test, we have built the small integration sphere for obtaining pre-flight flatfield images after the camera was placed into the spacecraft. The pre-flight correlation parameters between AMICA and near-infrared spectrometer, which is required to gain continuous visible-NIR spectra, are also obtained.

In this presentation, we briefly report the results of the Muses-C integration test, and outline the AMICA observation scenario.

Reference: Saito, J. et al. (2002) Proc. 23rd. International Symp. Space Technology and Science, pp.1980-1985.