

SUMMARY OF REMOTE SENSING OBSERVATIONS OF ITOKAWA BY HAYABUSA.

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Mission outline: Hayabusa was launched on May 9, 2003, and it arrived at its target asteroid Itokawa in September 12, 2005. Hayabusa stayed around Itokawa for about three months. In the first two months, Hayabusa carried out detailed scientific observations by using science instruments. In November 2005, it approached closely to Itokawa several times and touched down on it twice. The sampling sequence was not executed as planned, and moreover some serious troubles occurred in the spacecraft and the communication was lost for about one and half months after the second touchdown. Fortunately, the communication was recovered at the end of January 2006, and Hayabusa came back to the Earth on June 13, 2010. The capsule was successfully retrieved and later we found the material of Itokawa in it. The initial analyses of the samples were done in 2011 and then the samples were distributed to many researchers in the world. Hayabusa accomplished its main mission.

Remote sensing observation: Hayabusa has four scientific instruments. They are as follows: AMICA, optical camera called Asteroid Multi-band Imaging Camera (view angle 5.7 degrees with 8 band-pass filters), NIRS, Near-Infrared Spectrometer (view angle 0.1 degrees, wavelength 0.8 - 2.1 micron), XRS, X-ray Fluorescence Spectrometer (view angle 3.5 degrees, energy resolution of 160eV at 5.9keV), and LIDAR, Laser altimeter (1m accuracy at the distance of 50 km). By using these instruments, we studied the topography, mineralogy and surface components of Itokawa in detail. We concluded that the surface material is quite similar to LL-chondrite, which was re-confirmed by the sample analysis later. By the measurements of the density of Itokawa, we concluded that the internal structure of Itokawa was "rubble-pile". In this paper we review these results obtained by the remote sensing observations[1].

Touchdown points: Hayabusa carried out touchdown twice. The touchdown points are important for the study of sample analysis. However the precise estimation of the touchdown points is difficult because of some technical troubles. In this presentation, we will show the most probable points of the touchdown.

[1] Science, special issue "Hayabusa at Asteroid Itokawa", 2006, Vol. 312, pp.1330-1353, 7 papers.