SPACE EXPLORATION SYMPOSIUM (A3)
Small Bodies Missions and Technologies (5)

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HAYABUSA'S REENTRY AND RECOVERY OF ITS CAPSULE

Abstract

The Hayabusa spacecraft successfully returned to the Earth and re-entered into the atmosphere for sample recovery after also the successful touching-downs to NEO Itokawa in 2005. The reentry occurred on June 13th, and took place in Woomera Prohibited Area (WPA) of Australia. This paper presents how the reentry and recovery operations were performed, and also reports the current status about the sample curation activity.

The Hayabusa mission aims at demonstrating key technologies requisite for future real Sample and Return missions. However, the spacecraft adopted the actual Sample and Return flight sequence and was designed to make a world's first round trip to an extra terrestrial object with touching-down and lifting-off. It is the spacecraft propelled by the ion engines aboard for interplanetary cruise.

The Hayabusa spacecraft launched in May of 2003 reached NEO Itokawa in September of 2005 via Earth gravity assist in May of 2004. It stayed there for about two and a half months, and performed detailed scientific observation and mapping and determination of the shape. In November of 2005, the spacecraft made two touching-downs and lifting-offs having attempted collection of surface sample. At the second opportunity, the spacecraft directed shooting a projectile. But, due to the programming problem, presumably the projectile was not shot. However, the spacecraft may have captured some small amount of sample particles in a catcher aboard, when the spacecraft made actual touches down to the surface.

The spacecraft suffered from fuel leak in December of 2005, and the communication resumed after seven weeks of hiatus. And the ion engines all faced their life by November of 2009, and the project team devised an alternative drive configuration and successfully coped with the difficulty. Despite many hardships, the spacecraft has been operated for return cruise, and it made a reentry for sample recovery this June. The sample catcher was retrieved at WPA and transported back to the curation facility of JAXA. Currently the curators have examined analyzed the catcher recovered. This presentation quickly reports recent status of the spacecraft, capsule and sample analysis.