SPACE EXPLORATION SYMPOSIUM (A3)
Small Bodies Missions and Technologies (4)

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SYSTEM DESIGN OF HAYABUSA2 - ASTEROID SAMPLE RETURN MISSION TO 1999JU3

Abstract

The Japan Aerospace Exploration Agency is now developing the second asteroid sample return mission "Hayabusa2." Following the dramatic return back of Hayabusa from the asteroid Itokawa, Hayabusa2 aims at the round trip mission to the asteroid 1999JU3.1999JU3 is a C-type asteroid, which is supposed to contain organic matters and hydrated minerals. Thus it is expected that, after the successful sample collection, we could acquire more knowledge on the origin and evolution of the planets, especially the origin of water and organic matters. The spacecraft is extensively based on technological heritage of Hayabusa. It has four 10mN-class ion engines which realize a total impulse of about 2km/s. Three optical navigation cameras are aboard to enable the optical navigation in the rendezvous and the asteroid proximity operation. Near Infrared Spectrometer (NIRS3), Thermal Infrared Imager (TIR), Laser Altimeter (LIDAR) and three landers (Two from Japan, one from DLR) are equipped as scientific instruments. Sampler and Reentry Capsule enable three sampling (touch down) operations and Earth atmospheric reentry. Hayabusa2 is also equipped with a novel impactor system called Small Carry-on Impactor (SCI), with which we attempt to create a small crater on 1999JU3 for crater science and subsurface observation. Hayabusa2 is planned to be launched in December 2014, and then arrive at 1999JU3 in June 2018. It will leave the asteroid in December 2019 and return back to the Earth in December 2020. This paper describes the system design of Hayabusa2, some key technical challenges of the mission and the development status.