

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

Author: Dr. Hirotaka Sawada

Japan Aerospace Exploration Agency (JAXA), ISAS, Japan, sawada.hirotaka@jaxa.jp

Dr. Shogo Tachibana

Tokyo University , Japan, tachi@eps.s.u-tokyo.ac.jp

Dr. Ryuji Okazaki

Kyushu University, Japan, okazaki@geo.kyushu-u.ac.jp

Dr. Chisato Okamoto

Japan Aerospace Exploration Agency (JAXA), Japan, okamoto.chisato@jaxa.jp

Dr. Hajime Yano

Japan Aerospace Exploration Agency (JAXA), Japan, yano.hajime@jaxa.jp

Dr. Yayoi Miura

Tokyo University , Japan, yayoi@eri.u-tokyo.ac.jp

THE SAMPLING SYSTEM OF HAYABUSA2 MISSIONS

Abstract

Japan Aerospace Exploration Agency (JAXA) plans to launch the small asteroid explorer “HAYABUSA-2” in 2014, following the HAYABUSA mission. By improving the HAYABUSA probe, we are planning to visit the small asteroid “1999JU3”, and aiming sample-return from an asteroid of different type from Itokawa. The 1999JU3 is a C-type asteroid, considered to contain more organic or hydrated materials than S-type asteroids like Itokawa. What types of organic materials exist in the solar system, and is there any relation to life on Earth? - We will challenge these questions. HAYABUSA-2 will cruise toward the 1999JU3 using combination of ion engines and an Earth swingby. Arriving at the asteroid 1999JU3, the HAYABUSA-2 will observe its whole surface. The candidate points for touch-down will be carefully determined by using the observation results. After several rehearsals, it will collect a sample from the asteroid surface in the “touch-and-go” approach. The basic configuration of the spacecraft is mainly the same as HAYABUSA, with several minor modifications. The spectroscopic equipment and sampling system will be improved to be more suitable to C-type asteroids, because the surface of C-type asteroids is expected to differ from that of S-type ones explored by HAYABUSA. For example, we increase a number of rooms in the sampling catcher from 2 to 3, so that we can separate completely samples collected from different surfaces. Furthermore, we aim to sample noble gas, which came from collected samples stored in the sampling catcher and container. Therefore, we improve the container shape and a sealing method of latch and seal mechanism. The collected samples will be stored into the capsule, and return to the Earth after long homeward journey, to bring answers to our questions, “What types of organic materials exist in the solar system?” We will report the details of the sampling system of HAYABUSA-2, and introduce our developing status of the sampling system.