

Hayabusa-2, scientific objective and instruments

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"Hayabusa2" is a successor asteroid sample-return mission of "Hayabusa" (MUSES-C), which proved several new technologies and returned to Earth in June 2010. While establishing a new navigation method using ion engines, Hayabusa succeeded in bringing back samples from the S-type asteroid "Itokawa". A C-type asteroid "1999 JU3" is a mission target of Hayabusa2 to solve the material changes accompanying evolution from primitive solar nebula to present asteroid, and to elucidate the formation and dynamical history of planetesimal and present asteroid. A C-type asteroid is a more primordial body than an S-type asteroid, and is considered to contain more organic or hydrated minerals. Minerals and seawater which form the Earth as well as materials for life are believed to be strongly connected in the primitive solar nebula in the early solar system, thus we expect to clarify the origin of life by analyzing samples acquired from a primordial celestial body such as a C-type asteroid to study organic matter and water in the solar system and how they coexist while affecting each other. The configuration of Hayabusa2 is basically the same as that of Hayabusa, but we will modify some parts by introducing novel technologies that evolved after the Hayabusa era. For example, a new function, "collision device", is considered to be onboard to create a crater artificially. An artificial crater that can be created by the device is expected to be a small one with a few meters in diameter, but still, by acquiring samples from the surface that is exposed by a collision, we can get fresh samples that are less weathered by the space environment or heat. Onboard scientific instruments are a near infrared spectrometer and mid infrared camera. Optical camera and laser altimeter which are carried for navigation guidance are also used for scientific objective. Small lander and/or rover are also planned to be carried. Hayabusa2 is scheduled for launch in 2014 (or 2015 as a backup.) It should arrive at the C-type asteroid in mid 2018, staying around there for one and half years before leaving the asteroid at the end of 2019 and returning to Earth around the end of 2020.

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