

Hayabusa-2: Sample return from a near-Earth C-type asteroid, 1999 JU₃

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Hayabusa-2 is an asteroid exploration mission to return surface samples from a near-Earth C-type asteroid 1999 JU₃. Carbonaceous-type asteroids are expected to preserve the most pristine materials in the solar system that are an interacted mixture of minerals, ice, and organic matter, which would have later evolved to the Earth, ocean, and life, respectively. Space missions are the only way to obtain such pristine minerals, organics and volatiles with geological context and without terrestrial contamination. Moreover, because asteroids are the evolved remnants of planetesimals, detailed on-site observation by a spacecraft and analyses of return samples will provide direct evidence of planet formation and dynamical evolution of the solar system.

On-board scientific instruments are a laser altimeter, a multi-band camera, a near-infrared spectrometer, a thermal infrared imager, and a wide-angle camera for remote-sensing observation, and a small carry-on impactor for an asteroid-scale impact experiment. The sampling device, basically the same as the original Hayabusa, allows sampling three surface locations and stores surface rocks (>100 mg) in three separate chambers in a sample container.

Hayabusa-2 will launch this year, arrive on 1999 JU₃ in mid 2018, and fully investigate and sample the asteroid during its 18-month stay. The spacecraft will depart the asteroid in late 2019, and return to the Earth with samples in December 2020. Integration tests of the spacecraft are now being made, and the current mission status will be presented at the meeting.