

COLLABORATION PLAN BETWEEN HAYABUSA2 AND OSIRIS-REx THROUGH SAMPLE ANALYSIS BEYOND THE MOU

S. Tachibana¹, H. C. Connolly, Jr.^{2,3,4}, and D. S. Lauretta⁴.
¹Dept. Natural History Sciences, Hokkaido Univ., N10W8, Sapporo, Hokkaido 060-0810, Japan. E-mail: tachi@ep.sci.hokudai.ac.jp. ²Dept. Physical Sciences, Kingsborough Community College of CUNY, Brooklyn NY 11235 & Earth & Environmental Sciences, The Graduate Center of CUNY, 365 5th Ave., New York, NY 10016, USA. ³Dept. Earth & Planetary Sciences, AMNH, New York, NY 10024 USA. ⁴Lunar and Planetary Laboratory, University of Arizona, Tucson, AZ 85721, USA.

Introduction: Hayabusa2 launched off on December 3, 2014 to return surface samples of a near-Earth C-type asteroid 1999 JU₃ [1]. The spacecraft will fully investigate the asteroid for 18 months from June 2018, and sample the asteroid at three different locations. The samples from 1999 JU₃ will be delivered to the Earth in December 2020. The Origins, Spectral Interpretation, Resource Identification, and Security–Regolith Explorer (OSIRIS-REx) will be launched in September 2016 to sample a near-Earth B-type asteroid Bennu [2]. The spacecraft will arrive at Bennu in August 2018 and sample at least 60 g of surface regolith after detailed survey of the asteroid. The sample delivery to the Earth is planned to be in September 2023. Two asteroid sample return missions are operating at the same time, which is the first time since the Apollo-Luna days.

Collaboration between Two Missions Through Sample Analysis: In order to optimize the science return from two missions, we recommend more intimate collaboration between the missions, especially through sample analysis, than those described in the MOU (Memorandum of Understanding) between JAXA and NASA.

The MOU does not specifically include the exchange of mission personnel between each mission. We recommend: [1] Both the Hayabusa2 and OSIRIS-REx should share three key sample analysis personnel to be decided by each project for: (i) Curation and Sample Analysis of the returned Hayabusa2 sample, (ii) Sample Analysis Readiness Test for OSIRIS-REx, and (iii) OSIRIS-REx Preliminary Examination and Initial Sample Analysis. [2] Participation of Hayabusa2 personnel who assist in the curation of the Hayabusa2 returned sample with Preliminary Examination of OSIRIS-REx samples.

The MOU did not capture the training of the next generation of scientist through collaboration, but this is an important element to secure the future of sample return science. We recommend developing a plan to exchange students and post-doctoral researchers during asteroid encounter, Hayabusa2 Curation and Initial Sample Analysis, OSIRIS-REx Sample Analysis Readiness Test, and OSIRIS-REx Preliminary Examination and Initial Sample Analysis.

References: [1] Tachibana S. et al. (2014) *Geochem. J.* **48**, 571-587. [2] Lauretta D. S. et al. (2014) *Meteoritics & Planetary Science*, doi: 10.1111/maps.12353.