HAYABUSA2: CURRENT SUMMARY.

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Hayabusa2 is the 2nd Japanese sample return mission from C-type asteroid 162173 Ryugu. The porpose of the mission is to uncover the early solar system evolution and to obtain crusial information for the origin of life and water in the solar system. So far (till 2019 April), the science operations of the spacecraft went very well: we succeeded spectroscopic, morphological, and geological observation of an entire region of the asteroid for global mapping from Box-A (20km high) and -C (5-7km high), first touchdown on a part of the equatrial ridge after several time rehearsals, deployment of the small landers such as MASCOT, and injection of a metallic Cu plate (Small Carry-on Impactor) onto the asteroid surface. Chracteristic spinning-top shape and very low density (1.2 g/cc) indicate that Ryugu is a rubble pile asteroid formed by a catastrophic impact and deformed by high spin rates sometime after the impact [1]. Spectroscopic observation shows that Ryugu is very dark object (< 2% reflectance at 0.55μm with standard-measurement condition [1, 2]) and has a small 2.7μm (~10% absorption) band suggestive of a global distribution of phyllosilicates [3]. The closest analogue would be partially-dehydrated carbonaceous chondrites or C-rich interplanetary dust particles [2,3]. Ryugu's surface shows slight color variations: bluer areas are located at regions such as equatorial ridge and poles [2], although we do not fully understand what is resonsible for the colar variation. On the day of Feb 22th 7:29am (JST), HY2 spacecraft succeeded to touchdown on the surface area of L08-E1 that is very close to the planned touchdown point (deviation is ~1m), suggesting that the spacecraft was very wel controlled. A metallic projectile was fired when the sample horn touched the surface and numerous rock fragments were despersed from the surface and came to the horn, which we observed by CAM-H camera. Therefore, it is expected to some rock fragments to reach a catcher in the spacecraft. The sample recovery cupsule will be coming back to the Earth in December 2020 and the initial analysis of the returned samples will start from spring 2021.

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