Landing on Ryugu: Imaging plans for the MASCOT camera

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The JAXA Hayabusa 2 spacecraft is rapidly approaching its rendezvous target, C-type asteroid Ryugu. On-board is the Mobile Asteroid Surface Scout (MASCOT), developed by the German Aerospace Center (DLR) with major contributions by the French space agency (CNES) [1]. MASCOT will be ejected towards the surface of Ryugu in October 2018 to land around noon local time. Its mission is expected to last about two asteroid days and nights, depending on the on-board battery performance. Ryugu is of the rare spectral type Cg, with reflective properties of both the C and G-type asteroids [2]. MASCOT will provide the first close-up view of the regolith of a C-type asteroid. For this purpose it carries a variety of instruments, one of which is a wide-field camera with a CMOS detector and an LED array of 4 different colors [3]. The camera will support both the missions of Hayabusa 2 and MASCOT by characterizing the physical and scattering properties of the regolith at high spatial resolution, providing the ground truth for the remote observations by the Hayabusa 2 instruments, and providing context and guidance for the Hayabusa 2 sampling effort. Several mission phases can be distinguished, during each of which the camera will acquire data. Images taken during the descent will reveal the surface at increasingly higher resolution. After landing, MASCOT's attempts to upright itself will be documented. During the first asteroid day, the camera will acquire images at regular intervals, to study the reflective properties of the surface at different solar illumination angles. At night, several sets of images will be acquired at different times to deal with the challenging thermal environment. Naturally, the LEDs will be employed at night to provide illumination of the surface, but will also be used during the day to illuminate any terrain in the shadows. We describe the camera imaging plans for each of the mission phases in detail and present an overview of the anticipated scientific results.

[1] Ho, T.-M. et al. (2016), SSR, DOI: 10.1007/s11214-016-0251-6, [2] Binzel, R. P. et al. (2002), in Asteroids III, ed. W. F. Bottke et al., 255, [3] Jaumann, R., et al. (2016), SSR, DOI: 10.1007/s11214-016-0263-2.

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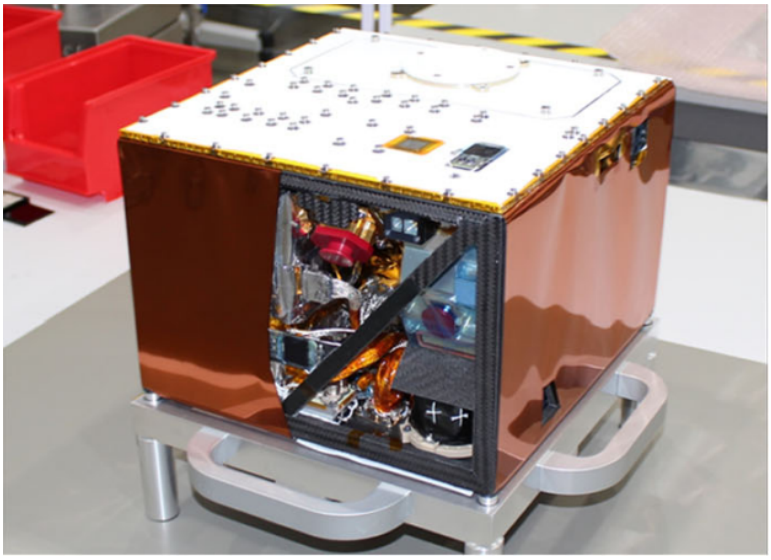

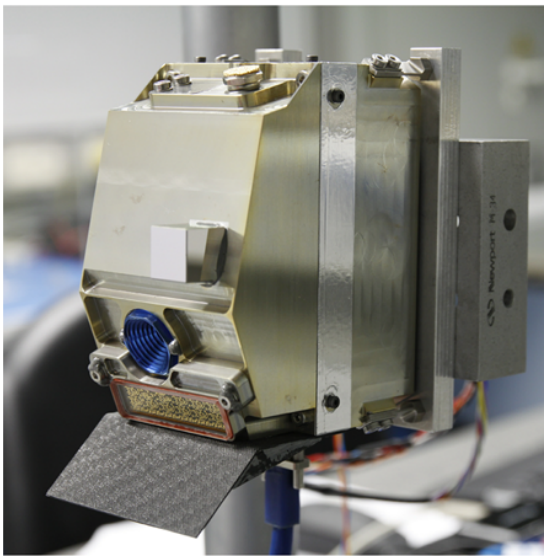

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