SPACE EXPLORATION SYMPOSIUM (A3)
Small Bodies Missions and Technologies (Part 1) (4A)

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FRENCH CONTRIBUTIONS TO HAYABUSA2-MASCOT: PHILAE MISSION INHERITANCE?

Abstract

Hayabusa2 is an asteroid sample return mission operated by the Japanese space agency, JAXA. It was launched in December 2014. The spacecraft has already performed half of its 4-year-long cruise to reach the mission target, a kilometer-sized C-type primordial asteroid called Ryugu, in search of organic and hydrated minerals that might give essential clues for the solar system formation. The small lander MASCOT (Mobile Asteroid surface SCOuT) carried aboard Hayabusa2 intends to land on the surface for in-situ investigations while the probe is aiming to study Ryugu on a global scale and to return samples to Earth. MASCOT was jointly developed by the German Aerospace Centre (DLR) and the Centre National d'Etudes Spatiales (CNES). It is equipped with a sensor suite consisting of four fully-fledged instruments. DLR was responsible for developing the MASCOT lander and ground segment, and is in charge of planning and conducting lander operations. CNES supplied the hyperspectral IR spectrometer (MicrOmega, IAS Paris), antennas and electrical power system that would be essential contributors to the on-asteroid operation success. These subsystems are partly inherited from Philae lander onboard Rosetta mission. CNES is responsible for MASCOT flight dynamics and is also providing a support for RF link, based on the expertise gained on the past science missions. The characteristics of Ryugu including the shape will be known only after arrival of Hayabusa2 in July 2018. Also, MASCOT's primary battery only allows it to operate on 2 asteroid days to perform science activities on the surface. Thus, the time available will be very short for either task and the different processes and teams involved have to be well prepared and trained. This paper is a complement to the project status made in "MASCOT – Preparations for its landing in 2018: a status update from ground and space one year ahead of the landing on Ryugu" paper.

And it will summarize the already performed and planned activities to prepare the French expertise center at CNES while focusing on the improvements/adaptations made on the subsystems inherited from Philae.