

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

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MASCOT, A SMALL ASTEROID LANDER READY FOR LAUNCH ON HAYABUSA 2

Abstract

The close observation of Near Earth Objects is of highest interest for scientific reasons but also, as they represent potential targets for future exploration, and cause a possible threat to the Earth by impact. In particular in-situ observations of asteroids and comets play an important role in this field and will contribute substantially to our understanding of the formation and history of the Solar System. Within the frame of the Hayabusa mission, JAXA succeeded on June 13th 2010 to return to Earth the first dust particles from a Near Earth asteroid. A follow-up to this mission, Hayabusa 2, is planned to be launched in December this year, and it will carry a small lander provided by DLR in collaboration with CNES, called Mascot (for Mobile Asteroid Surface Scout). Building upon the successful joint development of the PHILAE lander of the Rosetta mission, DLR and CNES have studied this lander since 2008, and its realisation was formally decided in early 2012.

After Hayabusa 2's arrival to its target – C type asteroid 1999 JU3 - in 2018, MASCOT will be dropped to the surface where it will perform in-situ investigations for about 15 hours. A hopping mechanism will enable measurements at several locations. The payload of MASCOT consists of four scientific instruments, a wide angle camera, an imaging IR spectrometer (MicrOmega), a radiometer (MARA) and a magnetometer. MASCOT will significantly enhance the overall scientific return of the Hayabusa 2 mission by providing context measurements to support the interpretation of analyses of the returned samples.

This paper will first give an overview of the scientific objectives of MASCOT. The design of the lander will then be presented, with a particular emphasis on French contributions. CNES provides MicrOmega (developed at IAS), the power sub-system, the antennas, expertise on telecommunication engineering, and is in charge of the mission analysis of the descent phase. Finally, we will elaborate on the lessons learned from this very short development, and on the status of the mission preparation at the time of the conference.