BASELINE DESIGN OF A MOBILE ASTEROID SURFACE SCOUT (MASCOT) FOR THE HAYABUSA-2 MISSION

Caroline Lange[(1)], Claudia Dietze, Tra-Mi Ho, Olaf Kroemer, Michael Lange, Lutz Richter, Susanne Wagenbach, Lars Witte and the MASCOT-Study Team

[(1)]German Aerospace Center (DLR), Institute of Space Systems, Robert-Hooke-Str. 7, 28213 Bremen, Germany, Email: caroline.lange@dlr.de

ABSTRACT

The Hayabusa-2 mission is currently being studied by JAXA/JSPEC as a sample return mission to the C-type near-Earth asteroid 1999JU3. Hayabusa-2, with launch planned for 2014/15, would be the immediate successor to the currently flying Hayabusa mission. Also, Marco Polo has been discussed and studied in the framework of the ESA Cosmic Vision as M-class mission for the same purpose.
A small separate landing package called MASCOT (Mobile Asteroid Surface Scout) has been originally proposed for the Marco Polo mission by the Institute of Space Systems of the German Aerospace Center (DLR) and has later been further studied following an invitation by JAXA/JSPEC.

The feasibility study that was carried out assessed different concepts for the lander that converged to a package with 3 kg of P/L, for a total mass of 10-15 kg. Presently, MASCOT is in the preliminary design phase and an Announcement of Opportunity for its payload complement is being prepared.

This paper is intended to give an overview over the current concept and system baseline design of the mission. We will present details on the study results for key mission elements, such as descent analysis, dimensioning of the power and communication subsystem and other dedicated subsystems, such as the mobility S/S. Also we will provide details on the current baseline operational strategy and basic scientific objectives for a small landing package to be carried on a NEO sample return mission. The focus of this presentation will be on the highly demanding constraints that are being imposed on the system due to the general mission scenario, the asteroid environment and the tight budgetary limitations and the means by which these constraints are being fulfilled, while the system will still be offering its excellent science potential.