

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – Science, Instruments and Technologies (3B)

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MSPC: RENOVATED EUROPEAN ACCESS TO THE SURFACE OF MARS

Abstract

The objective of the activity is to help define how to maintain and further develop European access to the surface of Mars, a major destination for European exploration, following the most recent, current and approved future missions (ExoMars 2016, ExoMars RSP, Mars Sample Return). The study represented the occasion for introducing all the heritage and lessons learned from ExoMars EDM Schiaparelli and ExoMars RSP missions: all the experience matured in the recent years has been injected into this exercise, taking into account the basic Lessons Learnt from Schiaparelli flight. All the most critical aspects related to the EDL, the parachute system, the avionics, the thermal protection and control system, the configuration and the structure have been reviewed with the objective to maximize the entry mass and provide increased volume, power and mass to be allocated to external resources including scientific payloads. High-fidelity trajectory simulations were performed so as to quantify how the proposed improvements on the vehicle translate into EDL performances: the Mars Surface Platform Capabilities (MSPC) study determines how to capitalize and improve on the Entry, Descent, and Landing (EDL) system of the 2016 ExoMars Schiaparelli mission. Compared to Schiaparelli, MSPC implements all the redundancies and FDIR's required for an Experimental Mission, in contrast to the Schiaparelli Demonstrator Vehicle concept, and enhanced EDL capabilities, and supports additional extra equipment mass.