

SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – Part 1 (3A)

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THE EXOMARS 2018 MISSION

Abstract

The ExoMars Programme is pursued as part of a cooperation between ESA and Roscosmos, with contribution from NASA, to explore Mars and prepare for future planetary exploration mission. The ExoMars Programme features two missions, one to be launched in January 2016 and one in May 2018 (with a back-up Launch planned for August 2020). The 2018 mission is devoted to develop a Spacecraft Composite (SCC), consisting of a Carrier Module (CM) and a 2 ton Descent Module (DM), capable to land on Mars and allow the egress of the European Rover and the operations of an instrumented landing platform. The 2018 mission will be launched with a Proton M/Breeze-M rocket and is expected to arrive on Mars on January 2019 (April 2021 for the Back-Up mission), The DM Surface Platform (SP) and the Rover Module (RM) will both carry scientific instruments for exobiology, geology and Mars atmospheric research. After planet targeting, the DM will be jettisoned from the CM shortly before atmospheric entry, for the subsequent ballistic entry and soft landing on the Mars surface, at a landing site within a latitude in the range -5 to +25 degrees. The CM, separated from the DM, will continue on its own trajectory until burn-up into the Mars atmosphere. The RM, once egressed from the SP, will explore surface and subsurface in the area of the landing site to conduct geological investigations searching for traces of past and present life for a nominal period of 218 sols. The RM includes a drill to acquire soil samples down to two-meter in the subsurface, dedicated sample processing and distribution mechanisms and the Pasteur Payload, with Survey and Analytical instruments, the latter hosted into an Analytical Laboratory Drawer. The communication with Earth, during the Entry Descent and Landing (EDL) and during the Mars surface operations phase will be guaranteed by the 2016 Trace Gas Orbiter (TGO). The 2018 operations will rely on the ESA Mission Operation Control Centre (MOC) using ESA-ESTRACK network with support from RNS (Russian Deep Space Network). The purpose of this paper is to provide an overview of the ExoMars 2018 mission describing the main characteristics of the SCC elements and the status of the program that is currently entering in phase CD. Emphasis is given to the technology developments and on the scientific challenges required to accomplish the landing on Mars and to perform a successful Rover Mars Surface mission.