

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

Author: Mr. Carlo Cassi

Thales Alenia Space Italia, Italy, carlo.cassi@thalesaleniaspace.com

Mr. bruno vinai

Thales Alenia Space Italia, Italy, bruno.vinai@thalesaleniaspace.com

Dr. giacinto gianfiglio

European Space Agency (ESA/ESTEC), The Netherlands, giacinto.gianfiglio@esa.int

Mr. pietro baglioni

European Space Agency (ESA/ESTEC), The Netherlands, pietro.baglioni@esa.int

## EXOMARS: ONE PROJECT TWO MISSIONS

**Abstract**

Following the recent evolution in the International Cooperation arena, the European Space Agency has successfully started discussion with the Russian Space Agency (Roscosmos – RSA), to maintain the current development schedule of the ExoMars project. The two Agencies are now going to actively work together to consolidate the cooperation plan to secure the overall ExoMars implementation scenario, which still foresees two missions, to be launched respectively in 2016 and 2018, both under the ESA leadership. The 2016 mission remains substantially unchanged w.r.t. the current baseline, with an Orbiter Module (OM) carrying scientific instruments and a UHF proximity link data relay payload, and an Entry Descent and Landing Demonstrator Module (EDM). The OM is provided by ESA and will carry two European and two Russian instruments. The EDM is also provided by ESA, however its mission scope is enlarged with one Russian surface package to complement the two European instruments and a Radio-isotope Thermal Generator (RTG)/Radio-isotope Heater Unit (RHU) package to increase the surface platform lifetime on Mars to one Mars year. The 2018 mission consists of a Carrier Module which will bring to Mars a large Entry, Descent and Landing Module hosting a 300 kg class Rover accommodated onto an instrumented landing platform; this mission scenario and the associated system architecture is therefore very similar to the previously studied “Enhanced Baseline Mission”, which was reviewed at the ExoMars Interim PDR (I-PDR) in March 2009. However, now relevant contributions would be different, whereby ESA would provide the Carrier and the Rover whilst RSA would take the lead of the Descent Module, though with some key subsystems (e. g. in the avionics and GNC areas) being provided by ESA. RSA will also provide scientific instruments both on the Rover and on the landing platform. The Rover configuration will be the one reviewed at the EXM System PDR in December 2010, with a 2 m subsurface Drill and with its Pasteur Payload complement.

For both missions RSA will provide the Proton M/Breeze M launcher to inject the SC into a direct transfer trajectory from the Earth to Mars. The profile of the 2016 mission will be similar to the present baseline; however it will have to be adapted to the new scenario for the phases following Mars insertion. In the 2018 mission the Carrier Module, after separation from the Descent Module, will burn and break during its crossing of the Mars atmosphere.