

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
Mars Exploration – missions current and future (3A)

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EXOMARS ROVER & SURFACE PLATFORM MISSION: A MAJOR ESA/ROSCOSMOS  
COOPERATION**Abstract**

The Russian Proton-M launcher lift off from the Baikonur cosmodrome, with the Exomars spacecraft composite as its precious payload, will trigger this unique scientific exploration mission, fruit of a nearly a decade-long cooperation between the European and Russian Space Agencies.

After separation from the Breeze-M upper stage, the European-built Carrier Module will guide the composite through its travel of several months until the Martian orbit, where it will release the Russian-built Descent Module allowing it to perform - also thanks to the European HW and SW integrated in its design - the critical mission phases of Entry, Descent and Landing on the Oxia Planum location of the Mars surface.

Then, shortly after landing, the module will open its ramps to allow the egress of the European-built Rover Module, which will start its at least 6-month long scientific mission, mainly performed by European instruments but also including some Russian contribution, exploring the Mars surface as well as its substrate by means of the absolute novelty for this category of missions represented by a 2-meter deep drill.

In parallel the Surface Platform, that is the static part of the landed module, will also start its scientific mission, in this case mainly performed by Russian instruments but also including some European contribution.

This very sketchy overview is already sufficient to give a first-hand impression of how complex and imbricated have been and will be in the coming months the technical and programmatic interconnections between the two cooperating Agencies, and how much the behaviour and the efficiency of the one depends on the behaviour and the efficiency of the other. Associating this consideration with the inherent, obvious difficulty of designing, developing and verifying such a complex mission, it is clear that only a continuous, deep and coordinated to the utmost detail, joint work may allow to successfully achieve the objectives of this Exomars mission.

Accordingly this paper will first present a short summary of the technical features, the operational scenario and the scientific purpose of the mission, emphasizing its enormously important scientific and technological objectives. Then it will more particularly focus on the international cooperation aspects, dealing with topics such as share of responsibility between the two partners, interleaved development and verification programs from both sides, cross-dependencies and resulting feed-backs, different standards, companies organisation, technical culture and mentality, and way how they have been / are being harmonised, as well as some concrete technical and programmatic difficulties encountered until then and their resolutions. Finally the paper will conclude with a brief status of the program at the moment of the deadline for its final release.