

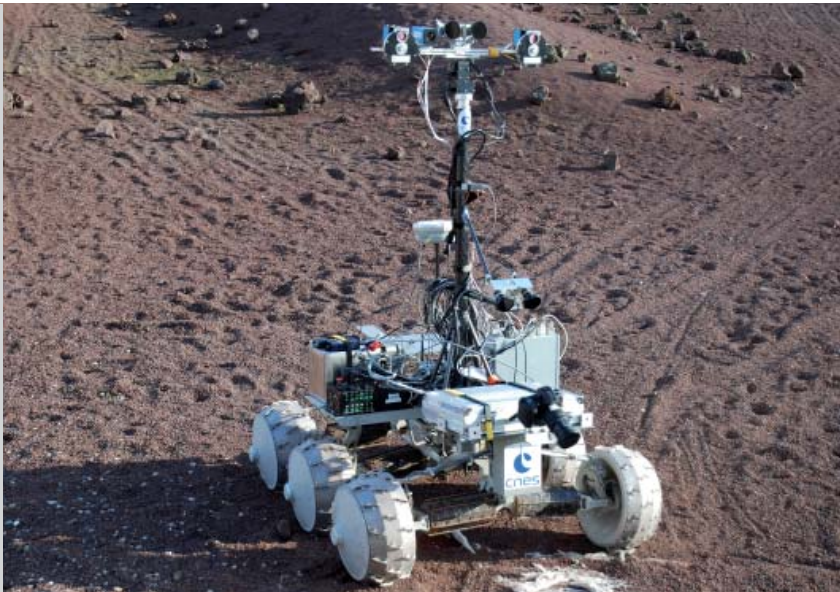
→ INSIDE EXOMARS

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Three of ESA's ExoMars instrument prototypes were carried on this rover model during tests, simulating the search for scientifically compelling places to drill on Mars. ESA will provide the ExoMars rover for the 2018 mission.
Credit: CNES



What's new for this quarter:

- Bilateral cooperation between ESA and Roscosmos on the ExoMars programme, with missions launching in 2016 and 2018, is confirmed.
- Russian instruments and two long-life science platforms on the Martian surface are among the additions to the new joint exploration plan.
- ESA will provide the full ExoMars rover for the 2018 mission; this has already passed its preliminary design review.
- Independent assessment of the 2016 mission schedule has been successfully completed, enabling the release of funds to industry until summer.

Shaping a new international cooperation to explore Mars

ESA and Roscosmos space agencies confirmed their cooperation for the implementation of two Mars exploration missions as part of the ExoMars programme by signing a Declaration of Intent on 6 April 2012. They agreed the overall division of responsibilities, while maintaining the launch dates in 2016 and 2018.

In 2016, a Trace Gas Orbiter and an Entry, Descent and Landing Demonstrator Module (EDM), both manufactured in Europe, will reach the Red Planet, carrying instrumentation from ESA and Roscosmos. Each agency will develop two instruments that will be carried by the Orbiter to investigate gases that are present in low concentrations in the Martian atmosphere but which could provide evidence for possible biological or geological activity.

The science mission of the EDM will be enhanced with the inclusion of Russian-developed instruments, a radioisotope thermoelectric generator and radioisotope heater units. The latter two new features will extend the duration of nominal science operations

to one Martian year (687 Earth days), providing continuous electrical power and the heat that will be necessary to survive the cold Martian nights. The long-life science platform will include the DREAMS (Dust characterisation, Risk assessment, and Environment Analyser on the Martian Surface) package, which will provide unique measurements of the surface environment during the dust storm season, including the first-ever atmospheric charging measurements on Mars.

For the second mission, to be launched in 2018, ESA and Roscosmos have agreed to send a large capsule to Mars with a surface science platform and a rover carrying both European and Russian instruments. The two science stations will operate in parallel, using the communications infrastructure

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of the Trace Gas Orbiter. The carrier module for this mission will be developed by ESA in cooperation with Roscosmos; the descent and surface modules will be developed by Roscosmos in cooperation with ESA. The rover is being built by ESA; Roscosmos will contribute a number of scientific instruments.

Roscosmos will provide a Proton launcher for both missions.

Updates on payloads and spacecraft design

An independent assessment concluded that the current schedule for the 2016 mission could be met, enabling the release of funds to industry until the end of June.

The detailed design of the Trace Gas Orbiter is progressing, with special emphasis on the updated interfaces with the Proton launcher and the scientific instruments supplied by Roscosmos. In parallel, the selection of the suppliers for all the spacecraft elements will be completed by September 2012 (80% of the suppliers have already been selected and 60% of the contracts are currently signed). In the second half of 2012, functional models of all the spacecraft electrical equipment will be manufactured and integrated into an electrical model of the complete spacecraft, the Avionics Test Bench, which will serve as a platform to verify the Orbiter's functional design.

The EDM teams have completed the challenging task of revising the surface platform accommodation design after the inclusion of the Russian scientific instruments, radioisotope thermoelectric generator and radioisotope heater units. A review of the preliminary design of the DREAMS science payload is currently under way.

Several tests with the full-size model of the mechanism that will give the correct separation velocity and spin rate to the EDM when released from the Orbiter have been successfully completed, as have tests with the full-size model of the EDM surface platform crushable structure, which is designed to limit the landing shock and avoid damaging the lander equipment. The data gathered during these test campaigns will support the finalisation of the detailed design, which will be completed in the summer of 2012.

Under the new cooperation with Roscosmos, the overall design of the 2018 mission has been established. The rover teams have returned to the design that has successfully passed its preliminary design review in December 2010. This rover will weigh approximately 300 kg and carry an instrument suite dedicated to exobiology and geochemistry. The rover teams are now studying the overall mission architecture, the interfaces with the descent module, the model philosophy, the schedule and related documentation.

While the discussions on the architecture are advancing, testing activities for the rover elements are ongoing. The drill tool electronics engineering model, integrated with the first version of the software, was successfully tested on a new set of Mars-analogue materials and the development and testing of the autonomous navigation system is also progressing. The engineering model of the powder sample handling system is being manufactured to test the complete sample handling and processing sequence by September 2012.

Save the Date

5-7 June Budapest, Hungary	Mars - Connecting Planetary Scientists in Europe http://konkoly.hu/MPSE/
12-14 June Houston, U.S.A.	NASA workshop on concepts and approaches for Mars exploration http://www.lpi.usra.edu/meetings/marsconcepts2012/
14-22 July Mysore, India	COSPAR 2012: 39th COSPAR Scientific Assembly and Associated Events http://www.cospar-assembly.org/

ExoMars Timeline 2012

January	Completion of study on possible cooperation with the Russian Federal Space Agency
February	ESA – Roscosmos report completed, confirming bilateral cooperation on the ExoMars programme
March	Successful independent assessment of the 2016 mission schedule Preliminary Design Review of the DREAMS payload - kick off
March – April	Mission concept review concluding on the joint Rover architecture

The complete timeline is available by following the link <http://exploration.esa.int/jump.cfm?oid=47088>

Disclaimer: Future milestones are indicative and subject to change

To stay informed about the ExoMars activities, visit the website and subscribe to our mailing list.