

SPACE EXPLORATION SYMPOSIUM (A3)

Mars Exploration – Part 2 (3B)

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THE MARS2013 ANALOG FIELD MISSION IN MOROCCO

Abstract

In February 2013, the Austrian Space Forum – together with more than 20 international partners – conducted a one-month integrated Mars analog field simulation in the Moroccan desert near Erfoud. The selected area is considered a relevant proxy for various types of geological features of Mars. Terrain topographies similar to the Martian desert and an extensive test area required a diligent exploration mission design. Experiments selected through a peer-reviewed process included activities in the fields of engineering, planetary surface operations, astrobiology, geophysics/geology, life sciences and others.

The remoteness of the location coupled with the dusty desert environment provided high fidelity simulation conditions to test operational procedures and candidate instruments for a human Mars mission. In addition to the engineering tests, the mobility of the Aouda.X and Aouda.S spacesuit simulators was tested as well as the physical workload perception of the suit tester by using a standardized questionnaire. It addressed the physical well-being of the tester and compared it to objective physiological data such as heart rates, fluid balancing and ECG.

MARS2013 was carried out under the PolAres programme and constitutes the tenth field test of the Austrian Space Forum. The mission was planned and operated in partnership with the Ibn Battuta Center in Marrakesh. Moroccan authorities provided invaluable help in setting up the logistics required for supporting this large-scale scenario. While a group of 10 persons was dispatched to the field (including three analog astronauts), some 60 people worked in shifts at the Mission Support Center (MSC) in Innsbruck, Austria.

MARS2013 is the biggest Mars analog simulation conducted so far on European or African soil. It also included a pressurized rover exploration scenario, with a team of four people setting up a small scouting

camp several dozen kilometers from the main base. A cooperation with Kiwospace and the Mars Desert Research Station in Utah, USA, involved several communication experiments, simulating loss of signal events between Mars and Earth. The field telemetry data was channeled via satellite to the MSC and enabled a Remote Science Support team to study field data in near real-time, giving valuable input to the flight planning as the mission proceeded. Such, also external researchers at their home institutions were able to obtain a high level of situational awareness. During simulations, a time delay of 10 minutes one way for all communications was introduced to simulate an average Mars - Earth distance.