

Highlights from Remote Controlled Rover for EuroGeoMars MDRS Campaign

J. Hendrikse^{11*}, B.H. Foing^{1*}, C. Stoker^{2*}, J. Zavaleta^{2*}, F. Selch^{12,2}, P. Ehrenfreund¹⁰, L. Wendt^{8*}, C. Gross^{8*}, C. Thiel^{9*}, S. Peters^{1,6*}, A. Borst^{1,6*}, P. Sarrazin^{2*}, D. Blake², L. Boche-Sauvan^{1*}, J. Page^{1,4}, V. Pletser^{5*}, E. Monaghan^{1*}, P. Mahapatra^{1*}, D. Wills^{1*}, C. McKay², G. Davies⁶, W. van Westrenen⁶, P. Batenburg^{1,3*}, G. Drijkoningen³, E. Slob³, P. Poulakis⁴, G. Visentin⁴, A. Noroozi³, E. Gill³, M. Guglielmi⁴, M. Freire⁴, R. Walker⁷, ExoGeoLab team^{1,4} & EuroGeoMars team^{1,4,5}

¹ESTEC/SRE-S Postbus 299, 2200 AG Noordwijk, NL, ²NASA Ames Research Center ³Delft TU Aerospace/ Geology and Civil Engineering, ⁴ESTEC TEC Technology Dir., ⁵ESTEC HSF Human Spaceflight, ⁶VU Amsterdam, ⁷ESTEC Education Office, ⁸FU Berlin, ⁹Max Planck Goettingen, ¹⁰Leiden/GWU, ¹¹HE-Space Bremen, ¹²Carnegie Mellon U., * EuroGeoMars crew (Bernard.Foing@esa.int/ Fax: +31 71 565 4697),

Abstract

The goal of the EuroGeoMars mission (from 24 January to 28 February 2009) was to demonstrate instruments from ExoGeoLab pilot project [1], support the interpretation of ongoing missions SMART-1, Mars-Express, validate a procedure for Martian surface in-situ and return science, and study human performance aspects [2,3]. Specifically amongst this was the usage of a remote controlled rover on loan from the Carnegie Mellon University at NASA Ames Research Center to support surface reconnaissance and in-situ operations.

Rover tests at EuroGeoMars MDRS

The rover part of this campaign was to validate the ease-of-use of the rover and evaluate its implementation as a tech requirement for remote controlled reconnaissance from the Habitat prior to EVA as well as in situ EVA support.

The Rover was first tested and deployed during a technical phase.

The next phase of the validation process focussed on setting up a high quality live video stream transmitted from the rover to mission control in the Hab. Followed by setting up an optimized transceiver link capable of communicating wirelessly with the rover not only in the vicinity of the Hab but also over a significant distance for realistic recon mission simulation.

After this Phase, Crew 76 was able to perform several missions including a solo night mission.

Both phases have given invaluable insight with regards to the use of rovers for in situ EVA support, and as a reconnaissance capability prior to initiating EVAs to remote destinations. Other valuable information includes the deployment and operational requirements such as mechanical interfaces, computing power, battery life, transmission delays and so forth).



Fig. 1: Preparation and Upgrade of the Recon-Rover with Camera and Video Systems.



Figure 2: Rover Remote operations from MDRS habitat

References

- [1] Foing, B.H. et al . (2009) LPI, 40, 2567.
- [2] Foing, B.H., Pletser, V., Boche-Sauvan L. et al , Daily reports from MDRS (crew 76 and 77) on <http://desert.marssociety.org/mdrs/fs08/>.
- [3] Foing, B.H. et al . (2009) ESLAB 2009 abstr., 84.



Figure 3: Test area for Remote Controlled Recon-Rover near MDRS station



Figure 4: Geological scene for Remote Controlled Recon-Rover near MDRS station