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Validation of Instruments and Robotics from EuroGeoMars&Moon Campaign

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Abstract

We describe Instruments technology and Robotics results from the EuroGeoMars campaign (and EuroGeoMoon study) in Utah Desert Research station (from 24 January to 28 February 2009). The goal of the mission was to demonstrate instruments from ExoGeoLab pilot project [1], support the interpretation of ongoing lunar and planetary missions, validate a procedure for surface in-situ and return science, study human performance aspects, and perform outreach and education projects [2].

EuroGeoMars campaign

The EuroGeoMars campaign (and EuroGeoMoon study) in included four sets of objectives:

1) Technology demonstration aspects: a set of instruments were deployed, tested, assessed, and training was provided to scientists using them in subsequent rotations

2) Research aspects: a series of field science and exploration investigations were conducted in geology, geochemistry, biology, astronomy, with synergies with space missions and research from planetary surfaces and Earth extreme environments.

3) Human crew related aspects, i.e. (a) evaluation of the different functions and interfaces of a planetary habitat, (b) crew time organization in this habitat, (c) evaluation of man-machine interfaces of science and technical equipment;

4) Education, outreach, communications, multi-cultural & public relations

Technology demonstration and robotics

Several science and exploration instruments were either brought from Europe or lent by US collaborators. Most were deployed and installed during the technical crew week (24-31 Jan):

- geology: drilling equipment, Ground Penetrating Radar (GPR), Raman Spectrometer, Visible Near Infrared Spectrometer (VIS/NIR), Magnetic Susceptibility Meter (all lent by NASA-Ames), X-ray Diffractometer/X-ray Fluorescence Meter (XRD/XRF) (by inXitu Co), sampling collection and curation, scientific and HDTV cameras for field and lab studies (lent by ESTEC ExoGeoLab), installation of geochemical lab;

- engineering supporting projects: rover (lent by Carnegie Mellon Univ.), visualization tests for rover, camera system and image data for outreach.

- biology: Adenosine Tri-Phosphate (ATP) Meter (lent by Ames), microscope (MDRS);

Additional instruments used during EuroGeoMars Crew 77 rotation from 1 Feb included:

- biology: Polymerase Chain Reaction (PCR) lab from ESTEC ExoGeoLab project;

- engineering supporting projects: enhanced Cyborg field reporting capability, Mars navigation experiment preparation;

- astronomy: Musk observatory (MDRS)

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Fig.1: Field rover used for reconnaissance or support to EVA

Fig. 2: EVA and drilling activities

References

[1] Foing, B.H. et al . (2009) LPI, 40, 2567.

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