

EuroMoonMars 2018 Workshop: Hands-on demonstration and practice before analogue simulations.

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1. Introduction

On the 19th and 20th of April 2018, the International Lunar Exploration Working Group (ILEWG) and ESA-ESTEC organized the annual *EuroMoonMars* Workshop and gathered speakers and participants involved or interested in the Moon-Mars Villages topic. The second day of the Workshop consisted of analogue simulations and we therefore used the first day to demonstrate, teach and train the analogue astronauts for the operations and tests they would run.

2. Device usage – Spectrometer and analysis

One of the main leads for investigation on the ExoGeoLab lander is spectroscopic analysis. In the end, the aim is to have a spectroscopic test bench on the lander, which could be operated remotely. During the Workshop, we could not run the test remotely yet, but we showed the attendees the operating of the spectrometer and the different results it allows to obtain. We first made a general presentation to everyone, before letting the analogue astronauts of the following day, and those interested in learning more about the operating, run the test themselves. It was an interesting activity: people who wanted to know more about spectroscopy and obtain some spectra themselves did so quite successfully, using different light sources and samples.

3. Operating ExoGeoLab lander's instruments

During the simulations, analogue astronauts had access to the ExoGeoLab lander. As the participants were not members of the *EuroMoonMars* project, they needed instructions, demonstrations and practice, even though they were provided with detailed procedures to guide them through the operation. Because of the complexity of the system, the first part of this demonstration consisted of a walkthrough

of the procedure to take the control of the lander and proceed the settings. Attendees could thus follow up the different steps thanks to the visual streaming, while *EuroMoonMars* team members gave real time advice. The idea here was to allow analogue astronauts to have a first overview of their task, without presenting too many details for non-participant attendees. In a second place, participants had time to practice and carrying out the task themselves or in small groups. With the help of the procedures and the team, attendees managed quite well to take control of the different devices.



Figure 1 Volunteers practicing on the control of the ExoGeoLab lander

4. Radio-communication rules

For the sake of realism, all communications between analogue astronauts and “Ground Support” during the simulations were gathered, normalized and codified. Consequently, communication protocols needed to be presented to future participants. These protocols, based on the use of normalized keywords and speaking priorities, were strongly inspired by aeronautic rules for radio communication, but adapted for the specific technology used for

simulations. In the first place, *EuroMoonMars* team members presented the basic rules and applied them to an easy scenario, and then let attendees practice through a few unscripted scenarios.

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