

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
Interactive Presentations - IAF SPACE EXPLORATION SYMPOSIUM (IP)

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PREPARING FOR ARTEMIS AND MOON OUTPOST EXPERIMENTS: TU DUBLIN PROJECTS AT  
ILEWG EUROMOONMARS 2021 TEAM

**Abstract**

We shall describe a series of experiments, habitats isolation and field campaigns developed by TU Dublin interns with ILEWG EuroMoonMars team in a work placement in the third year of physics studies. The aim is to build experience in the industry and develop scientific skills from all aspects such as laboratory work, network building, planning and general education. These will be met from participating in EuroMoonMars team projects. This includes Chile's Ojos del Salado Campaign, EMMPOL 3-4 3, CHILL-ICE 4, EMMATA 5 and AMM 6. The type of involvement on each project varies for each team member. Projects include the development of teleoperated and (radio) telescopes, the analysis of samples using spectroscopy, the investigation into portable laboratory equipment in the form of a lander and rover and the advancement in the understanding of human and machine interaction and communications. Telescope experiment (GB): When looking at the operation of telescopes and radio signals, being able to do so remotely from the safety of a controlled environment is a key aspect for campaigns on Earth, the Moon, and Mars. We test the equipment for errors, and develop a procedure for teleoperations and near real time analysis, providing high resolution information and acceptable noise on accessible targets. Samples spectroscopic analysis (HR): every planetary substance is composed of a mixture of molecules and compounds. The way in which these molecules are present and bonded provides substances with different spectral properties and characteristics; these properties may make the compound itself very valuable in terms of science understanding, and resource utilisation on the Moon and Mars. By analysing the samples collected on the campaigns such as EMMPOL 3-4 and CHILL-ICE different methods such as UV-Vis-NIR and IR spectroscopy can be used to identify and determine a diagnostic for each compound. Human and machine interactions and communications (KMcG): the overall protocol of the missions and wellbeing of the analogue astronauts will be the focus. Protocol is covering all the rules to follow to ensure the safety, efficiency and success of the mission. Communicating and interacting with the astronauts, remote support and equipment is a vital part of any campaign or mission. Rovers and lander instruments (CM) are an essential tool in exploring planetary surfaces. Where humans fall short, rovers can take the helm to support our missions and prospects. Therefore, exploring landers and rovers collaborations is a vital step to move forward in space exploration. Rovers such as the REMMI rover are being tested, investigated and scrutinised to determine what makes it efficient and overall useful rover. Campaigns such as EMMPOL will involve rovers performing various tests to determine these key factors and to build on a minimal rover

to optimise its performance for planetary exploration. 3. EuroMoonMars Poland campaign weeks 3-4 4. Construction of a Habitat Inside a Lunar-analogue Lava-Tube 5. EuroMoonMars Astronautics Training Academy 6. ArtMoonMars MoonGallery