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RESULTS FROM THE EMMIHS IV CAMPAIGN (EUROMOONMARS - IMA - HI-SEAS)

Abstract

The fourth EuroMoonMars - IMA - HI-SEAS (EMMIHS) mission took place between February 1st - 15th 2020 at the Hawaii - Space Exploration Analog and Simulation (HI-SEAS) habitat in Hawai'i, USA. It was part of the EMMIHS campaign, which is part of the EuroMoonMars initiative by ILWEG, the International Moonbase Alliance (IMA) and HI-SEAS. The EMMIHS IV mission consisted of a crew of six (four females and two males). The mission focused on scientific research on human factors, in situ resource utilisation, algae based materials, and lava tube exploration techniques. One of the research projects was to study the effects of physical fitness on human behaviour in an austere environment/space. Several types of physical training regiments were proposed to each astronaut. They were evaluated at the same time while going through the same physical regiments throughout portions of the entirety of the mission; on how much their daily performance would be affected, by way of various combinations of daily questionnaires, visual observations, state of their daily moods, sleep patterns, BMI, and daily physical check-ups. Another research project was focused on team dynamics in extreme conditions with expressive biofeedback for self awareness and communication. Multiple tests were performed to find if interpersonal synchronization and group cohesion would be enhanced. A series of workshops and creative exercises were explored to find the best tactics to combat isolation, support mental health, and wellbeing. Further research was on testing the cultivation of plants by using different mineralogical substrates and different nutrient solutions. First three different samples were collected from the Lunar surface. Then, the samples were transferred to the laboratory for separation and pulverization followed by the seeds planting. Each substrate's sample was irrigated by one of the nutrients solutions or water during the following days. After sprouting, each sample was photographed and measured daily. Finally, algae based bioplastics were tested for space propagation and for use as a substrate. Soft textiles to hard plastics were tested in the controlled air environment for potential use in space travel.