

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 3 (2C)

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STUDENT RESEARCH IN AN ANALOG LUNAR HABITAT : EUROMOONMARS & ANALOG
ASTRONAUT TRAINING CENTER POLAND EMMPOL2023 CAMPAIGNS 14 &15**Abstract**

The International Lunar Exploration Working Group/EuroMoonMars program includes research activities for data analysis, instrument development, field tests, training workshops, and outreach activities. EuroMoonMars field campaigns have been organised in Utah MDRS station, Rio Tinto, Iceland, La Reunion, LunAres Base, HISEAS base in Hawaii, and AATC Poland. Since EMMPOL 1 in 2020, this partnership has yielded engaging findings for lunar habitability conditions supported remotely by a mission control center made possible by the Analog Astronaut Training Center facility in Poland. The 14th and 15th EMMPOL campaigns will take place outside of Krakow, between 18th-26th February and 1st-9th March 2023, during which we expect to deepen and diversify the types of research done in simulated

lunar isolation. Our international and interdisciplinary crew will conduct the experiments below – notably on human cognition in isolation, hydroponic systems, and health science – and evaluate their findings in light of ongoing lunar settlement projects:

MoonLAB Exploration: An evaluation of habitat research instrumentation equipment necessary for a future surface mission to the Moon, both for internal vehicular activities and for extravehicular activities.

Hydroponic System for Plant Growth Mental Health : Study on the growth and uses of chamomile in hydroponic systems, from the optimisation of tea extraction protocols to mental health.

Cognition Optimisation of Long Duration Missions: A continuous Fine Motor Skill Assessment of subjects through origami construction to study the maintenance of fine motor skills during a space analog mission.

Cardiac Activity in Altered Gravity Vectors : This experiment will compare cardiac behaviour of a control group and the isolated crew in two gravity vectors, with a focus on blood pressure and heart rate in the lower legs.

Effects of Cryotherapy and Flexibility as a Metric for Joint Health : This experiment is intended to investigate the effects of Partial-Body/Whole-Body Cryotherapy on joint health/performance to slow cartilage degeneration in microgravity.

Eye Biometric Measurements : This study will document iris structure and pupillary light reflex with high resolution macro imaging to establish a method of eye data collection for future analog missions.

Behavioural Study of Decision-Making Processes and Physical Activity: This investigation will research how physical activity influences the decision-making style of subjects in isolation in response to Payne Index multi-attribute evaluative questions.

Habitat Wastewater Processing with Lunar Regolith : The aim of this work is to evaluate if moon regolith can change wastewater physicochemical properties before it's supplied to a more complicated purifying systems.