27th IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM (A5)
Human Exploration of the Moon and Cislunar Space (1)

Author: Mr. Marc Heemskerk
ESA BIC Prague, Norway

Mrs. Charlotte Pouwels
International Space University (ISU), The Netherlands
Ms. Marion Dugué
ETHZ Institute of Geophysics, The Netherlands
Ms. Aditi Sathe
ATG Europe B.V., The Netherlands
Mr. Chanud Sithipreedanant
Space Generation Advisory Council (SGAC), Thailand
Ms. Eleonora Zanus
REA Space, Italy
Dr. Eleonore Poli
Centre Suisse d'Electronique et de Microtechnique SA (CSEM), Switzerland
Mr. Javier Garrido
University of Groningen, Netherlands Antilles
Mr. Kevin McGrath
Dublin Institute of Technology, Ireland
Ms. Lucie Ráčková
Masaryk University, Czech Republic
Ms. Margot Issertine
University of Montpellier, France
Mr. Mykyta Kliapets
KU Leuven, Belgium
Mr. Oliver Swainston
International Space University (ISU), France

CHILL-ICE 3: PRELIMINARY MISSION RESULTS OF WORLD'S LONGEST LAVA TUBE ANALOGUE ASTRONAUT MISSION

Abstract

In August 2024, an international team of researchers, Early Career Scientists (ECS), and students, will organize the 3rd subsurface lava tube analogue campaign in Iceland; CHILL-ICE III. CHILL-ICE (Construction of a Habitat Inside a Lunar-analogue Lava tube – Iceland) was started as a project under EuroMoonMars in 2018 and grew into its own initiative in 2021. Since that time, four analogue missions by ICEE.Space have taken place, with the CHILL-ICE III of August 2024 being the fifth, and the first ever analogue astronaut mission to simulate a lunar night survival scenario, completely in the subsurface. During the mission, a crew of 4 will spend 14 days inside a lunar-analogue lava tube in Iceland. The simulation will be conducted in a close and confined environment with no access to daylight. Extra-Vehicular Activities (EVAs) with analogue suits will be conducted on the surface during local night to ensure alignment with the human experience of a lunar night for the complete duration of the mission.

The inherent objective of such analogue missions is to conduct human research in aspects as wellbeing, crew-cohesion, emotional awareness, vigilance, analysis of the physical, cognitive, and mental state of the crew members. CHILL-ICE III will expand the research objectives to include human-machine-interaction while performing in-situ exploration of the lunar simulated surface and subsurface. LiDAR mapping, and (semi-)autonomous UAV (Unmanned/Uncrewed Aerial Vehicle) operations that will be conducted as part of the CHILL-ICE III experiments will be vital to the future exploration that will be conducted by astronauts on and in both lunar and Martian surfaces.

Mission success of CHILL-ICE III is defined by completing at least 75

Initial mission results will be presented at the IAC 2024 in Milan, and the final mission report will include an overview of the research, a collation of ICEE.Space analog experiences of multiple missions and a comprehensive feedback to the analogue community for future missions.