

30th IAA SYMPOSIUM ON SPACE AND SOCIETY (E5)
 Space Architecture: Habitats, Habitability, and Bases (1B)

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ILEWG BTU IGLUNA SMART ICE LAB

Abstract

IGLUNA is the first ESA Lab demonstrator project lead by Swiss Space Center. This project brings together 20 student teams from 13 universities from 9 countries around Europe to develop a Human Habitat in Ice inside an ice cave at the Glacier Palace of Klein Matterhorn in Zermatt, Switzerland, from 17 June to 3 July 2019.

Mission of ILEWG BTU team in this project is to provide scientists with the capability to conduct examinations and measurements on ice samples and cores, and to preserve the integrity of these for current and future investigations. We work together with art scientists to visualize scientific data and provide public outreach.

ILEWG developed EuroMoonMars, an evolving pilot research programme starting with a Robotic Test Bench (ExoGeoLab) and a Mobile Laboratory Habitat (ExoHab) at ESTEC, ExoLaboratory (ExoLab). They can be used to validate concepts and external instruments from partner institutes. For IGLUNA we are developing a mobile Smart Ice Lab module to provide safe smart environment for VU science experiments. We will deliver and preserve samples mined by RWTH Aachen team.

Laboratory unit shall provide stable anti-contamination environment for a number of experiments. It shall integrate glove box workspace at least 100x40x50cm, airlock at least 40x40x40 cm, storage facility at least 60x40x35cm, science instruments (scale, thermometer, computer, cameras, lamps, pulveriser, saw, spectrometer VNIR/VISNIR, polarized microscope, microtome knife, heater pad, EC- and pH-meter, glass beakers etc.) For design of the lab unit we work with BTU Master architecture students. ILEWG

analogue astronauts will develop IVA protocols for laboratory unit operations, EVA protocols for sample return missions and lander operations. ILEWG analogue astronauts are currently on a space simulation mission at HI-SEAS base in Hawaii, where they are testing laboratory unit prototype by BTU students and prepare first protocols. We tested Smart Ice Lab instruments in the volcanic Eifel region in Germany together with VU team in October. We will give an update on tests we run at ESTEC simulation site, HI-SEAS mission and report on the results, lessons learned during IGLUNA Field Campaign.