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EXOSPACEHAB-X: A TRANSPORTABLE MOON BASE FOR ANALOG MISSIONS & OUTREACH

Abstract

Thanks to their capacity of recreating space-like conditions, analogs allow researchers to anticipate problems that will be encountered during missions and prepare for Space flights, thus minimizing risks. Analogs are also strategic for public engagement. Some facilities are open to university students, trainees and Phd researchers. Here, they can perform experiments, simulate mission protocols and validate concepts.

EuroSpaceHub is a European funded project under the EIT HEI initiative, led by EIT Manufacturing and Raw Materials. The EuroSpaceHub Academy is an educational program with the overall goal of training young students to Space, entrepreneurship and Astronautics. ILEWG Lunex EuroMoonMars has been involved in organizing analog campaigns since 2009, at MDRS (Utah), HI-SEAS base in Hawaii, in Iceland (CHILL-ICE), on the Etna/Vulcano (Italy), in Atacama Desert (Chile), at the AATC in Poland, ESTEC (Netherlands), the Eifel (Germany) and others. With growing demand in conducting analog research, Universities and companies are now increasingly looking for facilities to perform tests and experiments.

ExoSpaceHab-X is a transportable lunar habitat that is being developed under the Lunex EuroSpaceHub Academy. The project is conceived so that interested institutions can rent it upon request. In this way, a transportable facility can be shared among different scientific communities. ExoSpaceHab-X can be transported to different European locations with easy logistics and low costs. The habitat can be set up either to conduct analog missions with four astronauts or for outreach (events, short workshops, demos). This makes it a multi-purpose research site, where different activities can be performed.

The habitation module consists of two areas: a trailer and an integrated inflatable structure. The trailer houses the main functional areas: cooking station, sleeping quarters, lab with multipurpose experiment rack, workstation, hygiene area. The inflatable serves as airlock for EVA simulations, and it is conceived as a reconfigurable open space for outreach, which can be arranged to host events and workshops. The interior of the habitat isolates the astronauts from the outside: the lack of windows and natural light makes it an ideal place to test the effects of confinement; the the limited interior volume and sharing of space make the habitat a testing place for interpersonal and group dynamics.

The project aims to be an innovative solution within the landscape of existing analogs to train students and to communicate the strategic importance of these facilities to the public.

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