

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

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INTERNATIONAL MOONBASE ALLIANCE ANALOG SPACE MISSIONS AT HI-SEAS -
PREPARING FOR THE HUMAN EXPLORATION OF THE MOON & MARS**Abstract**

The International MoonBase Alliance (IMA), has been organizing regular simulated missions to the Moon and Mars at the Hawaii Space Exploration Analog and Simulation (HI-SEAS) habitat since 2018. HI-SEAS is a lunar and Martian analog research station located on the active volcano Mauna Loa in Hawaii. The missions that take place at HI-SEAS are open to space agencies, organizations and companies worldwide to take part in, provided their research and technology testing will help contribute to the exploration of the Moon and Mars. The crews are supported by a Mission Control Center based on the Big Island of Hawaii as well. A series of EuroMoonMars IMA HI-SEAS (EMMIHS) missions have been taking place at HI-SEAS since 2019. These missions bring together researchers from the European Space Agency (ESA), IMA, the International Lunar Exploration Working Group (ILEWG), European Space Research and Technology Centre (ESTEC), VU Amsterdam and many other international organizations. Crews on these missions perform geological, astrobiological and architectural research; technological tests using drones, 3Dprinters and rovers; as well as performing outreach and educational projects. The EMMIHS missions typically last for two weeks each. During this time, the crew is isolated within the HI-SEAS habitat, which they cannot leave without performing EVAs (Extra-Vehicular Activities) in analog space-suits and with the permission of Mission Control. Further support for the crew is provided by the remote support team based at the EuroMoonMars center at ESA/ESTEC in Noordwijk, the Netherlands. The EMMIHS campaigns aim to increase the awareness about the research and technology testing that can be performed in analogue environments, in order to help humans become multiplanetary species. Furthermore, the research and technological experiments conducted at HI-SEAS are going to be used to help build a Moon base in Hawaii, and ultimately to create an actual Moon base on the Moon, as part of IMA's major goals. Such technology testing will include closed-loop systems, in situ resource utilisation, construction of agricultural systems and other sustainable processes at HI-SEAS. Future missions at HI-SEAS include more EMMIHS campaigns, collaborative missions with ESA, NASA, University of Hawaii and with companies, such as SIFT and Ketone Technologies.