

## EMMIHS-III Mission General Overview

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The HI-SEAS (Hawai'i Space Exploration Analog and Simulation) is a Habitat on an isolated Mars-like site on the Mauna Loa side of the saddle area on the Big Island of Hawaii at approximately 8200 feet above sea level. HI-SEAS is unique, in its setting in a distinctive analog environment, where geological, physical, and psychological factors are as close to the Moon as possible.

EMMIHS-III is the third EuroMoonMars analogue mission at International Moonbase Alliance base at HI-SEAS, taking place from 18<sup>th</sup> January to 1<sup>st</sup> February 2020, and will elaborate on the work done by the previous two missions [1-4].

The six crew members (M. Musilova, M. Heemskerk, K. Edison, L. Brasileiro, P. Das Rajkakati, R. Heemskerk) will focus on different fields of investigation, depending on their fields of expertise, including domains such as geology, robotics, nutrition, crew psychology and cultural aspects.

The main subprojects and investigations are as follows:

<b>Name</b>	<b>Details</b>
Arch	Architecture study considering semi-private rooms inside the common workspace
Crop	Growing of plants in lunar analogue soils and human hair
Drone	UAV-acquired photographs for identification and mapping of the (direct) environment
FoOd	Nutritional study concerning crew health, well-being, and social factors with changes in food assortment
GeoSci	EVA Exploration of surroundings, lava tubes and sample collecting for XRF Analysis
Grad	Gradiometry tests, combining gravimetric and magnetometric data to discover and estimate sub-surface cavities, such as lava tubes.
HuFac	Human Factors experiment regarding social and psychological well-being,

	and contact within the crew and with local/remote support
MatS	A study regarding metallic material sciences in inter- and intra-habitat conditions.
MeWe	Medical Well-being of the crew, derived by basic body measurements, such as heart rate, blood pressure, balance, etc.
MKid	MoonKids; a Netherlands-based outreach and educational platform to teach and inspire young kids from ages 4 – 11.
MoGa	MoonGallery exhibition for outreach purposes, bringing art to the Moon
OuTS	Outreach, Thanks, and Social media. Sharing our discoveries on multiple platforms, focusing on extending the EMMIHS-network and international scientific presence.
OVEN	Sintering basalt at high altitudes to test the viability of sintering on the Moon and Mars.
REMM	Rover of EuroMoonMars, for outreach purposes, exploration, and Remote-Control opportunities
ROV	Rover deployment for an experimental human-robot interface, including the REMM, ZEBRO rover from the TU Delft, and Helelani, a planetary rover from PISCES.
XRD	Characterizing Mauna Loa basalts based on mineral abundances.

### Task distribution

For Archi, GeoSci, HuFac, MeWe, and OuTS, all crew members will be expected to assist in gathering data and processing, the other projects will have distinct PIs instated – depending on the crew member's field of expertise.

### Results

The first results are expected to be presented at the LPSC51 in March 2020 and the final results at the

EPSC later this year. Several subprojects are expected to be published individually as well, starting from May 2020 onward.

### **References**

*[1] 50th Lunar and Planetary Science Conference (2019), Abstract #1633 [2] 50th Lunar and Planetary Science Conference (2019), Abstract #1693 [3] 50th Lunar and Planetary Science Conference (2019), Abstract #2416 [4] 50th Lunar and Planetary Science Conference (2019), Abstract #3090*