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HI-SEAS: THE HAWAI'I SPACE EXPLORATION ANALOG AND SIMULATION HABITAT AND EMMIHS 2023/2024 MISSIONS AND RESEARCH

Abstract

Space analogue missions on Earth are used to prepare humankind for the challenges involved in settling the Moon or Mars. One of the places to explore these challenges is the Hawaii - Space Exploration Analog and Simulation (HI-SEAS) habitat. HI-SEAS is located on the Mauna Loa volcano on the big island of Hawaii, a very remote site fully surrounded by a lava field. The habitat itself can host 6 crewmembers. It is provided with a lab, an engineering room, a kitchen, two bathrooms, 6 individual bedrooms and an airlock. For extravehicular activity (EVA) outside, crewmembers wear an analog spacesuit and simulated oxygen reservoir, and go through full EVA protocols before leaving the habitat. Food provided on the missions is fully dehydrated. HI-SEAS is used to conduct research on crew dynamics, health and other topics, and to test new technologies for space. Research to date has included: growing algae in different circumstances; investigating the composition of nonliving matter microbiological life around the habitat; cognitive performance and the psychological effects of isolation; and the effect of the use of an AI support robot. A broad range of technologies have been tested here, including tool connection points on analog spacesuits as well as actual space suits; the transportation of medication by drone; hololens interactions; and portable Infrared Device (PORIS) for geological applications. This presentation and paper would like to be focused on all the capabilities of analog Moon/Mars missions and all the research acquired in the HI-SEAS habitat over the past two years.