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HI-SEAS: A LONG-DURATION HUMAN SPACEFLIGHT ANALOG IN HAWAII

Abstract

HI-SEAS (Hawaii Space Exploration Analog and Simulation) is a long-duration space exploration habitat in a strong Mars analog environment at 8500 feet on the slopes of Mauna Loa, on the Island of Hawaii. The first mission at HI-SEAS will involve six astronaut-like (in terms of education, experience, and attitude) crewmembers living in the habitat for 120 days under Mars-exploration conditions (e.g. with communication latencies and blackouts, in close quarters, under strict water-use rules etc.). HI-SEAS is unique, in that it is not only set in an analog environment, but a) we select the crew to meet our research needs (in serendipitous analogs, such as Antarctic stations, crew selection criteria are not controlled by researchers); b) the conditions (habitat, mission, communications etc.) are explicitly designed to be similar to those of a planetary exploration mission; and c) the site is accessible year round, allowing longer-term isolated and confined environment studies than at other locations.

The first crew has been selected from over 700 applicants, and the 120-day simulated mission will begin in April 2013. The primary study focusses on new forms of food and new food preparation strategies for long-term space exploration. In addition, each crew member is leading a research project. Crew projects include research on sleep and lighting, microbial load on habitat surfaces, rover-based exploration of lava fields, thermal modeling, autonomous farming, and education and public outreach. Finally, there will be a number of opportunistic (i.e. without interventions) research projects, on crew cohesion, exercise, communication strategies, and robot-assisted sorties. The mission ends in mid-August 2013, so we will be able to present preliminary results at IAC.