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Behaviour, Performance and Psychosocial Issues in Space (1)

Author: Dr. Christiane Heinicke
ZARM University of Bremen, The Netherlands

Ms. Jocelyn Dunn
United States

Ms. Lucie Poulet
Université Clermont Auvergne (UCA), France

Mrs. Anne Meier
National Aeronautics and Space Administration (NASA), United States

EVOLUTION OF CREW WORK ROUTINES IN AUTONOMOUS, LONG-DURATION MARS
SIMULATION MISSIONS

Abstract

A human crew on Mars is expected to have more autonomy than an astronaut crew in LEO. Therefore, crew autonomy is a key aspect of many simulated Mars missions, such as at the NASA-funded Hawaii Space Exploration Analog and Simulation (HI-SEAS) facility. HI-SEAS crews typically organize their own schedule around assigned research tasks, habitat maintenance, personal research projects, and leisure time.

We will present the self-organized schedules and habits of crews at three independent long-term simulations, HI-SEAS missions II, III, and IV which lasted 4, 8, and 12 months, respectively. Each crew consisted of 6 crew members initially and lived under the same Mars-like conditions: At a habitat on the remote, barren slopes of Mauna Loa volcano on Hawaii, which they were only allowed to leave in simulated space suits. All communication with the outside world was restricted to emails that were delayed by 20 min each direction to simulate the largest distance between Earth and Mars.

Our focus will be on the three core work-related aspects: Crew meetings and decision-making processes, organization and conductance of extravehicular activities (EVAs), and household-related duties such as maintenance or kitchen duties. We will identify where all three crews developed similar habits, and where crew habits diverged.

This work will help mission planners anticipate trends in autonomous crews on long-duration, long-distance missions and provide insights and guidelines for future simulated and real astronaut crews.