

HUMAN SPACEFLIGHT SYMPOSIUM (B3)
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SURFACE OPERATIONS DURING A LONG-DURATION MARS SIMULATION MISSION

Abstract

Exploration and field work are the primary purposes of future scientific manned missions to another planetary body like Moon or Mars. Since the crew will know the surface of Mars and their own physical state better than anyone back on Earth, it is likely that the crew autonomously plan and organize their necessary extravehicular activities (EVAs), potentially with the help of a mission support based on Earth.

However, few references exist to date for long-duration missions during which a substantial fraction of mission time is spent on EVAs. One of the longest simulation missions, HI-SEAS IV, ended in August 2016 and comprised a total number of 154 EVAs, lasting a total of 316 h. Wearing simulated space suits, the crew conducted those EVAs to fulfill four types of tasks: science, exploration, maintenance, and leisure.

We will analyze the evolution of the mission EVAs over time, in particular the actual time spent outside the habitat. In addition, we will provide estimates of the time spent on the planning of EVAs. The information may serve both as a reference and guideline, for mission planners and crews of simulated and real manned planetary missions.