HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Astronaut Training, Accommodation, and Operations in Space (5)

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ANALOGUE CAPABILITIES FOR HUMAN-IN-THE-LOOP SIMULATIONS OF SURFACE
OPERATIONS IN TRAINING AND RESEARCH

Abstract

Within the European MOONWALK Project, a Human Machine Interface (HMI) prototype has been developed, with the objective of simulating and improving the exchange of information of the Extravehicular (EV) Crew with Mission Control during planetary Extravehicular Activities (EVAs), while imitating the limited situational awareness and increased autonomy for future Long Duration Exploration Missions. The MOONWALK HMI features procedure viewing, media transfer, telemetry display, caution and warning display, video and audio streaming (including video from a scouting robot), voice loop system, robot control through push buttons and gestures.

The HMI prototypes have been used in conjunction with Communications Infrastructure developed for the project, including MCC and Remote Science Centers operated by ISS Flight Controllers and qualified scientists, a comms system for an intravehicular crew in a deployable habitat, a scouting robot, and the Gandolfi spacesuit simulator. The HMI has been tested in natural Water Immersion Partial Gravity conditions (Moon), and in desert-like analogue areas (Mars), and is operable under varying simulated communications delay conditions.

The simulation system is a valuable asset for training for future missions, and is now available for

trainers, researchers and developers to utilize in the context of training, engineering and science tests for human spaceflight missions.