29th IAA SYMPOSIUM ON SPACE AND SOCIETY (E5)
Space Architecture: Habitats, Habitability, and Bases (1)

Author: Dr. Sarah Jane Pell
ESA Topical Team Arts & Science, Australia

Mr. Zac Trolley
International Space University (ISU), Canada
Dr. Ryan Kobrick
Embry-Riddle Astronautical University, United States
Mr. Tatsuari Tomiyama
Florida Institute of Technology, United States

TECHNICAL RECOMMENDATIONS TO IMPROVE MARS DESERT RESEARCH STATION SAFETY, SIMULATION AND SCIENCE.

Abstract

We, the Crew 188, offer technical and psychosocial system recommendations based on our experience of the Mars Desert Research Station [MDRS]. Our aim is to help realise future, sustainable programmes of space exploration, utilisation and commercial development. We offer recommendations supporting the pursuit of technical goals drawn from a broad, forward-looking view of the technologies and systems needed including technical engineering, scientific, cultural, political, and societal. A style of "Martian camping", MDRS offered amenities to support likely Mars-planetary space activities and experience remote, isolated and extreme habitability. Under today's operational constraints and an aging facility, the design and operation of MDRS could be much improved. For example, Crew 188 faced a hazardous propane leak in the main habitat highlighting an inadequate response or protection mechanism; below-normal mission standard provisions including reduced water, food and up-link data streams; and the cessation of crew waste removal and water delivery services. Our responses to such challenges led to these recommendations sufficiently well focused to allow tangible progression—and dramatic improvements over current MDRS capabilities—to be realised in the foreseeable future. Future Mars crews will expect to "rough it" but they will also expect the autonomy, agency and security of basic 'luxury' provisions to create a home-away-from-home that supports a reasonable quality of working life. The Mars Society, and other analogues, could invest a small amount, for a large return on safety, simulation and science priority goals. A robust communications array, a thorough audit of essential health and safety provisions including emergency evacuation protocols; non-toxic waste disposal, Material Safety Data Sheets and up-to-date technical Engineering Schematics of the Habitat systems designs; and the advertised rations of food and water provisions, would ensure better health management of the crew and the local environment. Ultimately the real transformational value lies in the up-take of both public and private enterprise for sufficiently advancing our human capacity for technologies and systems for supporting a higher fidelity of simulation, and operational standards, for future exploration.