HUMAN EXPLORATION OF THE SOLAR SYSTEM SYMPOSIUM (A5)
Human Mars Exploration (2)

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DEPLOYABLE AND PORTABLE EMERGENCY SHELTER FOR MARS

Abstract

The Mars surface infrastructure as anticipated for future human missions should include habitation, rover and infrastructure facilities. With regards to potential EVA / science activities and related safety issues to be performed on Mars, an additional crew support element is recommended. The primary feature of such a facility shall be a portable and deployable shelter which can be employed in the event of an emergency requiring immediate action and where return to the base / rover is not possible in time.

Following the selection of prospective emergency scenarios and the definition of design criteria, a series of preliminary designs for an emergency shelter have been developed within an academic design studio. A 1:1 prototype has been built and tested during the Morocco Mars Analog Field Simulation in February 2013 as part of an operational evaluation of this deployable and portable multipurpose shelter.

On-Site, in Morocco the operability (deployment and retraction), the durability (multiple deployments), function (human-equipment-shelter) and adaptability (functional usability) were tested by 'simonauts'. Additional issues that were explored and evaluated included spatial usability, ergonomic suitability to actions and individual perception of comfort in relation to the activities.

This paper will introduce potential emergency scenarios and the design criteria for an emergency shelter. Furthermore, the design concepts will be introduced and the current prototype will be presented, concluding with lessons learned and updated design requirements.