HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Human Space Endeavours Young Professional Virtual Forum (9-YPVF.2)

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BENEFITS OF STANDARDIZATION: NEW OPPORTUNITIES FOR REDUCED COST CREWED SPACE ANALOGS

Abstract

A key barrier to the construction and operation of crewed space analogs is the high cost of design and construction. Analogs such as Mars 500, the Mars Society's MDRS and FMARS research stations and the HI-SEAS outpost in Hawaii range in cost from several hundred thousand US dollars to several million. More complex analogs such as the various Antarctic research stations and Biosphere 2 can carry significantly higher construction and operational costs. Lowering design and construction costs could provide emerging space nation with a means to simulate crewed space agency style missions which are characterized by small crews, fixed volume habitats and a science mission focus. Reducing the cost of habitat design and construction would allow more funding to be spent on operational costs and higher quality equipment. Affordable analogs could help to catalyze development of space programs by generating opportunities to forge international partnerships through research collaborations. Lowering the cost of analogs could also enable different kinds of research to be conducted by communities typically excluded from analog participation. At present the international community lacks a way to explore the issues raised by off-world settlement. Settlement introduces the design problem of scaling communities, which current analogs are not well suited to simulating due to the high cost of duplicating structures that are already very expensive. Deploying multiple low cost analogs in a single location could provide a way to simulate a scaling Mars settlement, allowing the social disciplines to explore issues that at present can only be examined in theory. This paper will present a model for constructing a low cost analog using commonly available materials such as shipping containers, pre-fabricated temporary structures and other off-the-shelf components.