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ANALOGUE MARS AND LUNAR OUTPOST AND HABITAT DESIGN CONSIDERATIONS, WITH FURTHER LESSONS LEARNED FROM EXISTING MARS AND LUNAR HABITATS.

Abstract

The Mars society has been operating two Mars analogue research stations, the Mars Desert Research Station (MDRS) in Hanksville, Utah, US and the Flashline Mars Arctic Research Station (FMARS) in Devon Island, Nunavut, Canada, for some time, with the aim of contributing to the larger international effort to go to Mars. It has been concluded that the time is ripe to implement a plethora of lessons learned through the largely amateur previous efforts, by designing an entirely new, next generation, analogue post. The author, also the founder of the OpenLuna Foundation, has developed extensive experience with these two research stations, and outlines many of the lessons learned, as well as items to be prioritized in the design of this next generation post. Issues covered include the size and use of space of a given facility, the time required for maintenance of the facility, and ways of decreasing this such as proper and well thought out initial design with appropriate materials, and sufficient training and documentation including documentation of repairs. Items lacking in the original habs include devices for increasing the automation of common (and time consuming) chores, such as dish-washing and reporting, as well as more reliable power and communications for the support of experiments and equipment along with complete documentation of these capabilities. Considerations that are often overlooked by designers focusing on the technological requirements of a facility are those things that might normally be considered needless luxuries when the users are to be highly trained and motivated individuals. It turns out that despite this drive, moral remains an issue, and these luxuries are hard to leave behind, especially when no good reason can be found for why they should or can not be included. Some examples include greenhouses and green space for fresh food and improved atmosphere, common space to work in in the presence of others, and possibly, pets.