Semi-privacy and Color Application as Elements of Habitability in Concept Designs for Extra-terrestrial Habitation

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Introduction

Concepts for designs of extra-terrestrial habitats are experiencing a growing importance in the space industry. New technologies and innovative materials bring the need for novel spatial arrangements in these habitats. Two of the most important components to improve habitability in extra-terrestrial habitats - the situation of privacy and color application - have been addressed in a lunar simulation (EMMIHS-II) at the Hawai`i Space Exploration Analog and Simulations (HI-SEAS) habitat. This analog astronaut mission was initiated by the European Space Agency’s (ESA) EuroMoonMars (EMM) and International Lunar Exploration Working Group (ILEWG) in cooperation with the International MoonBase Alliance (IMA).

The question of how much privacy is necessary to create a liveable environment in an extra-terrestrial habitat has engaged space architects for the last decades. [1] The same keen interest has been attributed to the importance of color in guiding architectural conceptions in the often colour-less environment of outer space. [2]

Less attention has been paid to the issue of semi-private space. Past analog astronaut missions at the HI-SEAS facility came across not only a lack of private space but also a scarcity of areas crew members could retreat to without completely leaving the common space. [2] Such semi-private areas bear great potential both from a spatial and psychological point of view.

Methodology

The research results presented here are based on several experiments conducted during the EMMIHS-II lunar simulation at the HI-SEAS Mars/Moon Research Facility. Potential benefits on crew cohesion, work effectiveness and personal mood were studied through setting up a semi-private area and assessing its use by the crew.

Further experiments investigated the analog astronauts’ reaction to disparate color situations inside the habitat and this semi-private space.

The findings will serve as a basis for future architectural design concepts in extra-terrestrial
habitats and also offer the potential for further investigations during future analog missions.

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References