Paper ID: 31770
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27th IAA SYMPOSIUM ON SPACE AND SOCIETY (E5)
Architecture for humans in space: design, engineering, concepts and mission planning (1)

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DESIGN AND IMPLEMENTATION OF A FRIENDLY ENVIRONMENT FOR LONG-LASTING STAY IN SPACE

Abstract

PURPOSE Human expeditions to the outer planets and beyond will definitely bring in many new interpersonal and psychological stressors that have not been experienced before, since there will be extraordinary levels of isolation and repetitiveness. With real-time communication with the Earth impossible, the crew-members will have to work autonomously and depend a lot on technical resources located on board. Architects and psychologists need to work together to make sure good space flight behavioral health, the presence of high levels of personal adjustment, and positive interactions with the social and physical environments. METHODS It is presented in this paper the design concept for the interior space of spacecraft or human accommodation in other planets, with the introduction of the latest developments of virtual reality system and robots to the construction of the future environment. Meanwhile, hinted by the latest developments of psychology, the idea of cognitive behavioral therapy is also introduced in the design and construction process of the environment. Utilizing cognitive behavioral therapy, which is a very sophisticated psychological treatment of insomnia, the environment presented in this paper enhances the association of different crew-members and improves their psychological status. Based on the well-established efficacy of group treatment of the aforementioned method, crew-members can reduce the level of tension in this environment. RESULT A designed environment integrating psychosocial aspects with behavioral, technical and environmental issues shows that the design of unit space can be easily extended to the more complex situation. Two measures are conceptualized and assessed: emotional status and subjective physical comfort. Results prove the effect prior to their deployment in space. CONCLUSIONS The spaceflight-analogous environments presented in this paper can be served for future Mars or farther mission design and training. By designing and constructing facilities that are activity oriented, habitability is increased thereby decreasing environmental challenges to behavioral health. Furthermore, this paper concludes with suggestions for increasing collaboration between architects and psychologists. These include increased sharing of assumptions and mutual advocacy for potent and sustained involvement in mission planning and execution.