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FROM CONFINEMENT TO COMFORT: THE ROLE OF INTERPERSONAL DISTANCE IN DESIGNING SPACE HABITATS

Abstract

In an era where the scope of space exploration is evolving and expanding, the importance of conducting psychological research within this discipline is becoming increasingly vital. Numerous questions about the psychological response to extreme conditions still need to be answered, as deep and long-term human space exploration still needs to be tested. Nonetheless, this is rapidly evolving into a tangible reality that must be addressed to properly devise strategic solutions that can serve as countermeasures to potential adverse reactions to prolonged isolation, confined spaces, limited and delayed communication with Earth, and reduced privacy.

Studies indicate that the challenging conditions of the space environment impact astronauts' behavior, health, and cognitive performance. These issues tend to worsen as the mission duration extends, and new challenges emerge with increased distance from Earth.

The design constraints of the mission introduce several challenges that compromise the goal of creating habitats where astronauts feel comfortable. Payload limitations, environmental constraints, and technology advancement play crucial roles in defining mission feasibility, often necessitating the design of habitats with limited spaces to meet these requirements. Thus, it is essential to develop innovative strategies to overcome these issues.

This research highlights the importance of privacy and the perception of space during extended missions. Spatial perception can shift significantly depending on the context. The confined nature of space habitats may feel restrictive as opposed to terrestrial habitations, unencumbered by the intrinsic limitations of extreme environments, which might play a significant role in the perception of physical distances. The shift lies in the perception within that specific space, where distances that seem standard in terrestrial buildings become cause for social friction on the Moon or Mars. Personal space and privacy gain extreme importance in an environment that imposes cohabitation and confinement for extended periods. Thoughtfully designed architecture can mitigate these issues and shift human perception towards a more pleasing experience, enhancing cooperation, task management, and work planning thus reducing the risk of mission failure.

This study aims to investigate the impact of spatial perception on human cognition during long-term missions and tries to propose countermeasures that incorporate architectural solutions and the integration of human machine interaction considerations within the habitat design.