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HABITABILITY TO THE MOON AND BEYOND: "LESSONS LEARNED FROM THE ASTRONAUTS"

Abstract

In planning for human long-duration and long-distance missions to the Moon and beyond, we learn that in this extreme and dangerous environment, the reliability and autonomy of the user-astronaut is a vital element. The field of habitability deals directly with creating a system interaction in order to support the reliability and autonomy of the astronaut necessary for the mission success.

How can we implement the right habitability so that we can support the astronaut?

Through collecting and analyzing user-astronauts' requests as related to the habitability of space missions, we see how those requests have been considered both historically and in present-day missions, particularly in the standards for habitability project requirements. From this research emerged validation that the evolution of the system's design is strongly connected to the users' needs; indeed, we know that the astronauts have been listened to due to the fact that we can find most of the astronauts' key requests in the standard. However, we also see that the final implementation of the habitability requirement on the system design of the space station and on the mission logistic is far less. What happened? Why is there a gap?

The challenge presented to us is to maintain direct involvement of the astronauts from the start and during the all system design as a means of supporting the correct implementation of the habitability design requirement.

Considering the actual plan for human missions to the Moon and beyond, this paper shows how the involvement of experienced user-astronauts from the very beginning of the system design is a key element for the support of the system habitability, guaranteeing the reliability and autonomy of the astronaut, both of which are critically necessary for long-duration and long-distance mission success.