

Review of: "A Case for Nature in Long-Haul Space Exploration"

Aman Chandra¹

¹ University of Arizona

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With a renewed focus towards human exploration of deep space, several questions around the survivability of astronauts and crew members travelling for long durations in space arise. This article picks up the important question of maintaining and supplementing the crew's cognitive and psychological capabilities in the face of challenging and complex long duration missions.

This article makes a case for technology assisted exposure to nature for spaceflight mission crew in long duration exploration missions. The authors do a good job of enumerating the benefits of such exposure on the cognitive abilities of the mission crew. The authors also rightly point out that while the need and benefits of nature are well established, a larger question is that of its implementation to deep space mission architectures.

The most fundamental considerations while designing spaceflight missions are mass of the payload, its size, total power available to the spacecraft and the mission's lifecycle cost. Any biophilic design element introduced will need to meet certain size, weight, power and cost (SWAP-C) requirements. The authors propose the use of audio-visual methods of intervention providing a nature like experience. While these will not have a weight and size impact, their power and cost impact as a function of their complexity must be well characterized.

It will be interesting to see studies on how varying immersive audio visual technologies can be implemented without impacting mission operations negatively. Such experiences will also need to be tailored to support the cognitive needs of crew members exposed to long duration low gravity and exposure to higher dosages of radiation than we are used to on Earth. In terms of mission operations, considerations would also need to be made in terms of scheduling and access of such interventions for individual crew members.

This article provides a good introduction to the benefits of exposure to nature, especially in the context of extended spaceflight missions. The authors advocate a mission design philosophy that incorporates biophilic elements and propose audio visual experiences for the crew to feel close to nature. Future enhancements to this work could include a discussion about implementation aspects of such technologies in the mission's life cycle starting with mission design up-to mission operations and end of mission life.