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A VR-BASED SYSTEM FOR IMAGING, ASSESSMENT, TRAINING AND JUST-IN-TIME
GUIDANCE FOR DEEP EXPLORATION-CLASS MISSIONS

Abstract

The current human roadmap for exploration-class missions eyes locales as far as Mars, where the communication lag to Earth ranges between 8 to 48 minutes, roundtrip, depending on the alignment of the two planets. This isolation means that medical capabilities for such missions will need to evolve towards more in-situ independence that empower the crew physician and medical personnel to practice medicine, diagnostics, therapeutics and procedures with decreased reliance on Earth, while simultaneously facilitating skills maintenance and just-in-time training. Virtual Reality (VR) systems have been proven to be beneficial in both astronautics and medical education, and stand to fill this potential gap in exploration-class missions going forward. In this paper, we present a VR-based medical imaging system (SieVRt) and a VR/AR-based education, training and just-in-time guidance system (CareGiVR) to support medical personnel on deep space missions. To date, the SieVRt VR-medical imaging system has been tested by means of teleconsult during an underwater mission in a saturation dive complex and parabolic flight, while the CareGiVR system has reached initial prototyping. We conclude by looking at next steps, and additional applications for remote and resource-limited settings on Earth.