

IMAGERY SYSTEMS FOR ENHANCED CREW HABITABILITY, PERFORMANCE, AND PRODUCTIVITY ON THE INTERNATIONAL SPACE STATION

M. Whitmore,¹ V. Byrne,² M. Segal,¹ S. Ramsey,¹ and J. Chastain²
¹NASA Johnson Space Center and ²Johnson Engineering

Imagery Systems are intended to enhance crew performance and productivity and improve habitability on the International Space Station (ISS). The success of the mission will be dependent on crew performance and maintenance of productivity, against a background of confinement in a largely unchangeable environment. Psychological well being on long duration missions has been identified as an issue that has implications for crew performance, productivity, and ultimately mission success. A potential solution to the concern of the psychological well-being of the crew is the implementation of an Imagery System. This Imagery System could display desired information or images (work or entertainment) such as pictures, movies, assembly procedures like a "Magic Window". A magic window for exercise such as a VR display could show a moving scene that changes as you advance on a treadmill. Because this kind of integrated Imagery System is a relatively new concept for use in human space flight, functional and technical requirements needed to be defined before implementation. Over a three-year period, the goal of this project is to report on the functional and technical requirements of imagery display systems, to perform usability testing of the systems identified that meet the requirements, and to develop a training manual for use.

Preliminary efforts have included developing a survey in order to determine the desired functional requirements for this system, as well as a recipients list for this survey. The recipients list included long duration crewmembers, habitat chamber study participants, and members of NASA hardware development groups, flight crew trainers, and flight surgeons and other flight medical personnel. Also, a search for state-of-the-art screens such as LCD TV Monitors, Plasma TV Monitors, Flat Screen TV monitors and other existing technologies was conducted and a matrix of findings was generated. A list of existing requirements that may be potentially applicable was created. Furthermore, information on analog environments was compiled for effective use as a testbed for the initial survey. These analog environments included, Antarctica, Devon Island and the Aquarius Habitat. In addition, information has been collected on lessons learned from ISS, Mir, and Skylab mission debriefs.

The next steps involve distributing the survey among the NASA community. This will aid in performing the feasibility analysis in order to determine the functional and technical requirements of an Imagery system for ISS. In addition, distribution of the survey in other analog environments with long duration missions will be explored, such as the Aquarius Habitat mission scheduled for April 2002.