

HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Astronaut Training, Accommodation, and Operations in Space (5)

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LIVING LAB – USER-CENTERED DESIGN RESEARCH STRATEGIES TO REDEVELOP SPATIAL
QUALITY AT THE ISS

Abstract

Spaces with limited spatial volume and quality may lead to extreme stress for people either living or working in them. The challenges are even greater when opportunities to leave home or work place for a shorter or longer time periods are limited. Stress can cause human errors and technical disasters. However, many people are forced to work in less comfortable conditions and live in one-room apartments. This paper reviews past surveys on ergonomics and user-experience and reports on new research on astronauts, cosmonauts and space tourists as special focus groups. The paper proposes novel design strategies to improve living and working conditions at the ISS for crew safety and well-being. Living lab is a concept that brings together interdisciplinary experts to develop and test in actual living environments new technologies and strategies for design (MIT Living lab).

The paper proposes research and international collaboration to develop novel guidelines for private and public missions. Standards and building codes offer guidance for building construction and design-engineering. The traditional design principle to organize spaces in private, semi-public and public zones are discussed. The basic functions and places in home and work environments from eating to sleeping, from sports to cultural activities, from recreation to socializing form the core of the Living lab research. The opportunities and challenges to customize own living and work place are discussed. The results from Living lab experiments are beneficial for the design of future space stations and habitats, for technology transfer and vice versa.