HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)
Enabling Technologies for Human Space Endeavours (2)

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SPACE STATION VISUAL DESIGN FOR THE ASTRONAUTS RELIABILITY.

Abstract

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Living with microgravity and in confined conditions in space has a profound influence on human life. Colours, shapes and movements are the visual stimuli of an ergonomic investigation aimed at increasing the habitability of spacecraft. Taking into account that orientation in microgravity is achieved only visually, now that the vestibular system has become silent (Mallowe 2001) astronauts have to rely upon the visual design of a spacecraft for both their orientation and well being (Schlacht 2008).

Using the ISS as the subject of our investigation, we considered how the astronauts' efficiency was affected by such negative visual stimuli as storage difficulties and inconsistent Russian and American label standardization.

In the "μgOrienting" project, a team of experts from France, Germany and Italy is carrying out experiments on visual stimuli to improve the habitability of manned space missions. Such a project takes into account the bio-mechanics of the inner ear and the function of the organ of equilibrium in relation to gravity and is geared towards ergonomic spacecraft design. The consequent field of study is the development of an interest in human factors in the design of a technological environment and in the adaptation of man in his challenge to live in Outer Space.

As sequential phases of the "μgOrienting" project three experiments have been considered: CROMOS, WIUD and ZEROgYMN.

- The CROMOS experiment was successfully accomplished in 2007 during the ESA Student Parabolic Flight Campaign. This experiment analyzed the physical modification of colour perception in microgravity conditions.

- WIUD stands for "Where is Up and Down" and is an experiment that studies instinctual reactions towards colours and symbols for upwards and downwards orientation. In this experiment the subject, lying in a "bed rest" posture (-6 degree feet up), is asked to indicate up and down in relation to different contexts (spacecraft interiors, symbols, colours configurations).

- The ZEROgYMN experiment in collaboration with Turin University (Italy) is in a developmental stage and focuses on the relationship between movement and visual input in μg and neutral buoyancy.

The "μgOrienting" project is conducted at the Chair of Human-Machine Systems Technische Universität Berlin in collaboration with Turin University (Italy). Visual stimuli such as colour and signage may be key factors not only for orientation but also for increasing the overall habitability for long duration missions in microgravity.

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