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COLOR DESIGN REQUIREMENT IN MICROGRAVITY LONG DURATION MISSIONS.

Abstract

In microgravity the visual perception is of primary importance to perceive orientation signals, because in weightlessness 'people suppress vestibule signals and become increasingly dependent on vision to perceive motion and orientation', (Mallove, 1991).

The design of color involves signals such as risk information, monitor interface, interior design, but also psychological aspect. Color influences the perception of a setting or one's behavior in that setting, also it influences on the perceived temperature, weight and spaciousness. The color of interior habitat may act on the central and vegetative neurological system, arousing and calming properties are been ascribed to colors in studies developed from the start of 1900.

Even if these factors can be minimal, in a long-term space mission it will generate strong effects on psychological mood of astronauts. In the perspective of Moon, Mars and Phobos missions, well being, reliability and efficiency of the astronauts will become a priority for their feasibility.

During my undergraduate stage at Alcatel-Alenia-Space-Italy (3-8/2005), I had the opportunity to study design propose for the interior colors of space habitats. Trought this experience I have been able to state that the color requirement utilised today, need to be optimised for the context of long duration missions. After this study I am planning to prepare my final thesis on the topic of color requirement of long duration mission space habitats, that will be the theme of this paper.

The purpose of this paper is to describe how new color requirements have been generated, particularly for future long duration missions in space and for the future space architectures, studied within a "human centered design" methodology.

For the planning of the ISS interior design (ISS Interior Color Scheme NASA 2001), the colors have the function of: 'orientation and direction cues', 'on board inventory management', and to 'assure to psychologically acceptable environment' (NASA, 2001). In habitat for missions of long duration, for which the reliability of the astronauts becomes of primary importance, plan requirement must consider the psycho-physical well-being of the astronaut. Therefore the interior colors must have as it objective: well-being, orientation, support of the necessities.

The paper will present in detail the philosophy generating the new requirements based on, the idea that the best human environment is on earth and, taking in account human exaptations (Gould and Vrba, 1982, Exaptation = preadaptive biological traits) to microgravity. So in a confined space environment it will assure all the stimuli that are part of the Earth normal conditions, like sunlight variation and season modification of the color.