Taskforce Group Actieplan Ruimtevaart

“Mental Health and Entertainment”

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We realize that psychological and social problems are just as important as technical difficulties on long duration space missions. We established the taskforce group “Mental Health and Entertainment” with Matthias Rauterberg as contact person. The taskforce group will, amongst carrying out research projects, identify strategies to maintain mental health, motivation, ensure an effective quality of life in space (Harrison, 2004) using entertainment products and services.
The results of the proposed studies are being put to good use on the International Space Station; but the station is just a stepping stone to the final frontier. At some stage during this century humans will travel to Mars. The psychological and social aspects of such an exploration are huge.
Efforts have to be made to help avoid boredom, boost morale and reduce interpersonal conflict on current International Space Station missions and future flights to Mars.
Until now, ESA and NASA have selected crews mainly according to the skills the various members possess. But for interplanetary space travel, and long stints on the Space Station, the Agencies realize that personality and social behavior may become the desicive factor.

Human needs to achieve mental health can be described according to Maslow (1970) as follows:
Physiological Needs (PN) are the very basic physiological needs such as air, water, food, sleep (see Czeisler and Brainard, 2003), sex, and body comfort. When these are not satisfied we may feel sickness, irritation, pain, discomfort, etc. These feelings motivate us to alleviate them as soon as possible to establish homeostasis.
Safety Needs (SN) have to do with establishing stability and consistency in a changing and challenging world, and are mostly psychological in nature. We need the security of a protected private space and intimate social relationships.
Love Needs (LN) and belongingness are next in importance. Humans have a desire to belong to a social group. We need to feel valued by others, and accepted by them (see Ritsher, Kanas, Weiss and Marmar, 2003; Palinkas, Johnson and Boster, 2004).
Esteem Needs (EN) are twofold: First is self-esteem which results from competence or mastery of a task. Second, there is attention and recognition that comes from others. This is similar to LN, however, looking for admiration has to do with the need for power and being in control.
Self-Actualization (SA) is "the desire to become more and more what one is, to become everything that one is capable of becoming", maximizing one’s potential, and seeking for knowledge, peace, esthetic experiences, self-fulfillment, etc.

Entertainment can address several needs (Zillmann and Vorderer, 2000; Raessens and Goldstein, 2005). We can distinguish between ‘lean back’ entertainment (e.g., video, music, etc) and ‘lean forward’ entertainment (e.g.,

playing, gaming, etc). Entertainment affects motor behaviour, cognitive and perceptual capabilities, emotional states, and social behaviour.
Cognitive and perceptual capabilities can be influenced by entertainment and recreational activities. Among the benefits of entertainment are the maintenance or improvement of problem solving abilities, enhanced perceptual skills (Green and Bavelier, 2003), and a distraction from work. Leisure activities can be chosen that require any desired result, from fine motor skills to enhanced attention span (Pope and Bogart, 1996).
Emotional and physiological states are influenced by both the form and content of entertainment. When freely chosen, entertainment can produce desired states such as relaxation, but also is capable of producing increases in arousal states. Entertainment, such as music, karaoke, video, games, can induce the range of human emotions and enrich daily life.
Social behavior is required in multi-player gaming, whether face to face or at a distance, and whether it involves live or simulated others. Games foster cooperation among participants, who, even in a competitive game, must participate as equals and cooperate in following rules. Virtual pets and robots require caretaking on a regular schedule, helping to maintain a daily routine and providing some of the comforts of social interaction.
Motor behavior is required for muscle training (e.g., sport), and fine motor skills as in Rubiks cube. Technology permits highly active and interactive games and virtual games and sports.

The success of human space flight depends on astronauts remaining alert while operating highly complex, state-of-the-art equipment, and interacting with other crew members. A crucial factor of mission success is that crew members do not get bored or have to cope with fatigue on a physiological as well as psychological and social level. The reduction of total working hours at ultra long space flights, weightlessness, a confined environment and additional social demands make permanent and full awareness difficult in space and increase the demand for social interactions. These factors may lead to mood changes, increased risk of accidents and possible mission failure. The demands of the mission and the limitations of their physical and social environment may all contribute to fatigue and a diminished cognitive and/or physical capacity to complete the mission efficiently and successfully. Investigations of human performance factors at the individual and group level can lead to countermeasures that reduce human error and optimize psychological and social performance during ultra long space missions.

Roadmap Contribution
2006-2010: transition from problem identification to research results
2010-2014: transition from research results to countermeasures

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