

SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Behaviour, Performance and Psychosocial Issues in Space (1)

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NEUROCOGNITIVE PERFORMANCE DURING MARS500 SIMULATION. IMPLICATIONS FOR  
TRAINING AND SELECTION PROCESS.

**Abstract**

During space missions, astronauts are exposed to an environment that induces detrimental effects on mood and performance. This is confirmed by a number of studies that report impacts on mood, cognitive functioning, workload, and social aspects during long-term inhabitations in space. Unfortunately what causes these problems- whether they are primarily mediated by microgravity (e.g. hemodynamic) changes itself or related to secondary, unspecified stressors (e.g. confinement, space habitat, life support systems, elevated levels of CO<sub>2</sub>, noise, workload, social situation) remains mainly unknown. The impact of these parameters gains more and more attention as plans to travel to Mars become more realistic. As humans will have to spend an enormous amount of time in cramped social spaces with limited nutritional supplies, the importance of mood and cognitive performance is great. In summary, influences on cognitive performance, mental health and mood during long term confinement/space flights are multidimensional. We can study some of these variables in simulations while preparing for future real manned missions to Mars or asteroids. The Mars 500 facilities provide the unique opportunity to explore some aspects linked to individual and social adaptation to isolated and confined conditions during a long-term space mission simulation. It allows investigating some psychological factors of the adaptation process, like those related to cognitive functioning. Analysis of results by Mars500 crew for winSCAT computerized neurocognitive battery is presented in this work. Data offers information regarding some neurocognitive processes such as focus, selective and sustain attention, working memory, visuo-spatial processing, reaction time and maths. This data shows results corresponding for three main phases of Mars 500 simulation including going to Mars, orbit around Mars and comeback. Data showed variability intrasubjects and intersubjects during the months of the experiment. Implications for training, selection procedures and simulation experimental design are discussed based on results.