

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

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INDIVIDUAL SUBCONSCIOUS ADAPTIVE PROCESSES TO THE MARTIAN FLIGHT  
SIMULATION

**Abstract**

**Introduction**

Previous space simulations allowed defining several psychological factors, negatively influencing adaptation and increasing the risk of not complete accomplishment of Mission protocol. The long duration of Mars Mission, as well as autonomous flight conditions could facilitate these negative effects for the crew and Mission Control. Also autonomous flight conditions require more profound knowledge of these negative factors in order to establish new effective methods of psychological support.

**Methods**

“Mars 105” crew consisting of 6 subjects (4 Russians and 2 Europeans) were the test subjects for neurosemantic diagnostics. It included evoked potentials caused by subconscious verbal stimuli (30 and 50 msec). Monopolar EEG in the points F3, F4, T3, T4, P3 and P4 was registered simultaneously. To define evoked potential for the particular stimulus, cross-correlation and wavelet analysis was made. Comparison of meaningful and meaningless stimuli allowed to estimate the extent of involvement of certain brain areas in the semantic data processing. Registration of evoked potentials for various stimuli was made before and after isolation.

**Results**

Significant changes in behavioral patterns before and after the Mission were detected. They are:

- increase of psychophysiological tension as reaction to the names of certain crewmembers, representing different cultural groups;
- strengthening of psychological defense mechanisms concerning the basic phobia: death, loss of health, as well as family relationship, probably, connected with sexual deprivation and separation with social surrounding;
- appearing of addictive tendencies, reflecting the change in subconscious attitude to alcohol, increase of its importance.

**Conclusion**

Changes in basic mechanisms of subconscious reactions under isolation should be further investigated in longer Mars 500. They can also form the basis for the new approaches to the psychological support in the autonomous Mars Mission, based on the new computer technologies.