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THE MARS-500 CREW IN DAILY LIFE ACTIVITIES: ETHOLOGICAL STUDY

Abstract

The future challenges of Martian exploration by humans lead to new goals for investigations in space life sciences. What would be the behavioral profile of an interplanetary crew with long-duration social isolation and spatial restriction? This study carries some answers regarding the first ethological data from the Mars-500 experiment that took place in Moscow-Russia from the June 3, 2010 to the November 4, 2011. It was designed to simulate the living and working conditions of an isolated and confined crew that spanned 250 days for reaching Mars, 30 days on the planet, and 240 days for returning to Earth. The Mars-500 crew was composed of three Russians, two Europeans and one Chinese. The Mars-500 facilities comprised four hermetically sealed interconnected modules and a Martian surface module. We applied the ethological method based on the observation, the description and the quantification of the individual and inter-individual behaviors in terms of personal actions, facial expressions, collateral actions, interactions and verbal communications. Such events were scored on the "Observer XT" software, from video recordings made every two weeks at breakfast time and every month during a group discussion within the habitat module. We found the following: a lack of diversity in the behavioral expressions with limited motor patterns that imply personal actions and visual interactions; an high level of collateral activities; a slight increase of a common non-native language using; a prevalent place using; various verbal behavior profiles. We will discuss the findings on the cultural influences and the individual differences as a source of heterogeneity with equilibrium and disequilibrium in the crewmembers' expressions, in synergy with the time effect. Considering Mars mission scenarios, the interplanetary crew appears to follow cyclic and periodic behavioral changes as nominal adaptive processes.