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EXP 91 AURORA MISSION: ASSESSMENT OF HUMAN ADAPTATION IN A MARS ANALOG ENVIRONMENT

Abstract

The colonization of Mars will be one of the greatest challenges humanity will face in its pursuit of becoming a multi-planetary species. To address these challenges, the scientific community has developed analog missions conducted in extreme conditions on Earth. The Aurora Analog Mission, a multidisciplinary crew selected by the Fundación Acercándote al Universo (FAU) of Mexico and carried out at the Analog Astronaut Training Center (AATC) in Krakow, Poland, aimed to evaluate human adaptation in environmental conditions similar to those of Mars. The mission included the study of isolation dynamics, the impact of circadian cycle disruptions, exposure to higher carbon dioxide levels than on Earth, communication delays between the analog habitat and mission control, and blackout exposure. These conditions tested the physical, psychological, social, intellectual, and emotional aspects of the crew members, who were continuously monitored for their physical and mental well-being. Additionally, specialized training sessions were conducted, including a human centrifuge experience at the Military Institute of Aviation Medicine in Warsaw, simulating adaptation to hypergravity up to 3.0 Gz and microgravity conditions. The data collected during the mission provides crucial insights into the challenges that the first Mars settlers will face, enabling the development of strategies and technologies to optimize human adaptation and proactively address potential issues before they arise in real missions.