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HUMAN PERFORMANCE OF A COLOMBIAN AEROSPACE FORCE CREW IN
EXTRAVEHICULAR SPACE ANALOG IN THE ILMAH HABITAT IN NORD DAKOTA (ATLAS)

Abstract

This study assesses human performance during an extravehicular exploration space analog mission conducted by a crew within the ILMAH habitat in North Dakota. The research employs observational cross-sectional methodology structured into phases: a 13-day isolation and confinement mission incorporating various experimental tasks, and post-mission data analysis. Mission activities encompass material studies for rover design, emotion analysis, natural language processing utilizing machine learning algorithms, physiological monitoring during simulated extravehicular walks, and the creation of communication delay simulation platforms. Tasks assigned by the University of North Dakota as well as extravehicular activities are also conducted. The analysis primarily focuses on evaluating the impact of isolation and confinement on diverse physiological parameters such as the hypothalamic-pituitary-adrenal axis (HPA), autonomic nervous system dominance, caloric expenditure, heart rate variability, and sleep quantity and quality. The findings demonstrate that the use of NASA MATB2 facilitated the assessment of the effects of isolation, confinement, and extravehicular activity on divided attention, reaction times, and workload management. These results were further leveraged to evaluate operational performance during isolation and confinement, delineating both technical and non-technical skills crucial for the advancement of space missions.