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THE MARTIANAUT PROJECT: STUDYING THE PHYSICAL, PSYCHOLOGICAL AND PHYSIOLOGICAL OUTCOMES AND UNDERSTANDING ISOLATION CHALLENGES IN AN I.C.E ANALOG SIMULATION IN A PIONEERING ONE-PERSON MISSION; A PILOT CASE STUDY

Abstract

The space sector has seen an increasing interest in longer-duration space missions with current plans by various government agencies and commercial organizations to fly multiple human crews to Lower Earth Orbit (LEO) including missions to the lunar surface within the next decade. Therefore, there exists an imperative to examine the impact of isolation and the effects of confinement conditions on crew members and the potential impacts on mental health, such as loneliness, boredom, anxiety, and depression. The MartiaNAUT Project explores the mental, physical and physiological outcomes of a one-person analog astronaut mission engaged in a fully immersive real-time simulation. This pioneering single-person pilot study aims to mitigate spaceflight risks and to understand the implications of extended isolation and simulated conditions on an individual's psychological, physiological, and physical status. The study investigates coping mechanisms, stressors, and resilience factors within the unique context of solitary analog astronaut experiences. By delving into the intricate interplay between isolation, mental health, and medical outcomes, the research sheds light on crucial insights that contribute to the broader understanding of human adaptation to space-like environments, informing future space exploration endeavors. This pilot project studied a 34-year-old African-American male from the USA with a bachelor's degree in electrical engineering and prior experience as an analog astronaut in 2023 participating as a crew member in MMAARS Crew 2302 mission deployed in Mojave Desert, California. The subject lived in the MMAARS habitat for approximately 200 days under Isolated, Confined Environment (I.C.E) conditions. MMAARS is a vanguard organization in the field of analog astronautics simulations, Since 2014 the entity has pioneered and deployed over thirty analog astronautics missions to various fidelities, from the arid, dry Mojave Desert to high altitude regions of Nepal in the Himalayas. This study holds the potential to

enhance our understanding of the psychological and medical challenges associated with solitary analog astronaut missions under varying durations in isolated and confined environments (I.C.E), thus, offering valuable insights for the planning and execution of future long-duration space exploration endeavors. In conclusion, the Martianaut Project can potentially be a novel therapeutic countermeasure for overcoming mental and health challenges. of astronauts.