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HYBRID QUALITATIVE/QUANTITATIVE DATA COLLECTION FROM 10-DAY LUNAR/MARTIAN ANALOG HABITABILITY STUDY

Abstract

Simulated planetary analog studies performed on Earth have provided valuable qualitative and quantitative data collection assisting researchers with identifying a wide range of psychological challenges often experienced in human spaceflight. While suitable space crafts, life support systems, radiation shielding and weight restrictions are also challenging for extended duration missions, introduction of humans into space environments and other planetary bodies will be critical because of operational constraints within habitats. The scope of this paper will examine and discuss self-assessed qualitative and quantitative data collection of a crew member at the University of North Dakota 10-day planetary space simulation feasibility study performed in October-November 2013. Although participant observation is often characterized as qualitative, this research will also include quantitative dimensions. The subject's quantitative data collection consisted of physiological information through daily general health surveys. Qualitative information pertaining to psychology and human factors was attained by journal entries correlated with assessment of human habitability of simulated Lunar/Martian module living conditions and operations. By utilizing word analysis software, study of the various cognitive, structural and process components presented in the individual's verbal and written speech samples will be analyzed. Software consisted of Linguistic Inquiry and Word Count (LIWC) developed by James W. Pennebaker, et al., and was used to determine the degree that any text uses positive or negative emotions, self-references and 70 other analysis dimensions of the samples set. Results will analyze qualitative data and then be cross analyzed with quantitative health questionnaires given at three intervals each day. Through this research, pertinent habitability information will be provided to the scientific community by analyzing the subject's assessment of environment acclimation, physical comfort levels, group cohesion and stressors. These assessments will assist with designing future ground based analog missions and further develop human factor related spaceflight. The environment used for this research consisted of a 12 by 3 meter inflatable habitat and pressurized rover with suit ports attached to rear entry full pressure surface space suits. All components were connected by a series of airlocks designed to minimize entry of harsh contaminants such as lunar regolith or Martian dust. Studying the usability of these components on Earth provides affordable analog simulation research correlated with challenges astronauts may experience while living on the surface of the Moon and Mars.