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DEVELOPMENT OF AN INDEX OF HABITABILITY USING CONVERGING INDICATORS: PHYSIOLOGY, PERFORMANCE AND SUBJECTIVE REPORTS.

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Abstract

The purpose of this project is to develop and validate a quantitative method for assessing environmental effects on individual crewmembers during spaceflight. Previous research has shown that the use of converging indicators (physiological and subjective self-report measures) is a significantly more reliable method for assessing environmental effects on performance than any one indicator alone. A recently conducted pilot study used this method to assess individual differences in the capacity to adapt to sustained hypergravity. Four adult men were individually tested in the human centrifuge at NASA's Ames Research Center. Subjects occupied a small compartment, equipped with bed, video entertainment, laptop computer, toilet facilities and food and beverages. Each subject lived aboard the centrifuge for 22 hours under three conditions: 1-g (i.e., no rotation), 1.25 g and 1.5g. Subjects were in video and voice contact with investigators and medical monitors at all times. Ambulatory physiological data were collected continuously. Subjects were required to perform a "stand test" at 4-hour intervals to evaluate their orthostatic tolerance. Performance tests and mood state scales were performed on a laptop computer following each stand test, and symptom reports were obtained verbally. Initial results show that it is possible to differentiate between individuals who experienced orthostatic intolerance and or motion sickness, and those who were non-symptomatic. Further, physiological profile data may be used to predict adaptational capacity and suggest that training control of autonomic responses (i.e., Autogenic-Feedback Training Exercise-AFTE) may help to reduce or eliminate symptoms. We anticipate that this project will provide a means of assessing **individual differences** in adaptation to space, readaptation to Earth, and the effectiveness of countermeasures designed to facilitate adaptation.