

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Life Support and EVA Systems (6)

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HUMAN EXPLORATION MISSIONS - MATURING TECHNOLOGIES TO SUSTAIN CREWS

Abstract

Human exploration missions beyond low earth orbit will be long duration with abort scenarios of days to months. Providing crews with the essentials of life such as clean air and potable water means recycling human metabolic wastes back to useful products. Individual technologies are under development for such things as CO₂ scrubbing, recovery of O₂ from CO₂, turning waste water into potable water, and so on. But in order to fully evaluate and mature technologies fully they must be tested in a relevant, high-functionality environment; a systems environment where technologies are challenged with real human metabolic wastes. It is for this purpose that an integrated systems ground testing capability at the Johnson Space Center is being readied for testing. The relevant environment will include deep space habitat human accommodations, sealed atmosphere of 8 psi total pressure and 32% oxygen concentration, life support systems (food, air, water), communications, crew accommodations, medical, EVA, tools, etc. Testing periods will approximate those of the expected missions (such as a near Earth asteroid, Earth-Moon L2 or L1, the moon, and Mars). This type of integrated testing is needed not only for research and technology development but later during the mission design, development, test, and evaluation phases of preparing for the mission.