

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

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GROUND EVALUATIONS OF TECHNOLOGIES FOR LONG-DURATION HUMAN SPACEFLIGHT  
MISSIONS**Abstract**

Human exploration missions beyond low earth orbit will be long duration with abort scenarios of days to months. This necessitates provisioning the crew with all the things they will need to sustain themselves while carrying out mission objectives. Systems engineering and integration is critical to the point where extensive integrated work on the ground is required to identify and mitigate risks. Ground test capabilities are needed to integrate all the systems for a mission along with a human crew, including all the relevant environments; life support (food, air, water, and waste), communications, crew accommodations, medical, EVA, tools, etc. Testing periods should approximate those of the expected missions. This is needed during research and technology development phases of a program as well as during the design, development, test, and evaluation (DDTE) phases for flight. Testing should be carried out at the mission level – “fly the mission on the ground”. Mission level integrated testing facilities are available at numerous locations around the world such that a “distributed test environment” is possible. NASA’s plans for such evaluations will be discussed.