

HUMAN SPACEFLIGHT SYMPOSIUM (B3)
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DESIGN STATUS OF THE LIFE SUPPORT RACK ACLS FOR ACCOMMODATION ON THE ISS
AND BEYOND

Abstract

The Life Support Rack ACLS does comprise a regenerative life support system for closed habitats. With regenerative processes the ACLS covers the life support functions of CO₂ removal, oxygen generation and CO₂ reprocessing. ACLS will be installed and operated in the International Space Station's Destiny module, which offers all interfaces needed for its extended operations.

The fully integrated ACLS Engineering Model (EM) that initially served for development is an integral part of the Ground Segment at AirbusDS, then to support troubleshooting wrt in-orbit anomalies, as applicable. Besides, the EM will serve for testing on the ACLS operational flexibility beyond its design point, this in view of an envisaged extension of the nominal service provision through ACLS ops on-board the ISS.

The fully integrated Flight Model (FM) has passed environmental testing and will be subject to performance and safety tests in support of Flight Readiness and Phase-III Safety Review envisaged to be concluded in mid-2017.

In parallel, the operations concept and associated ground segment infrastructure are being established and validated in support of ACLS Flight Readiness, accordingly.

As per the recommendation of NASA's System Maturation Team (SMT) the Life Support Rack ACLS shall be operated on the ISS for a cumulative period of one year to demonstrate the maturity of ACLS technologies for future exploration missions.

Besides heading for such technology demonstration onboard the ISS, ACLS ground operations data are being evaluated and, well respecting the requirements for future exploration missions beyond the ISS, technology enhancements and amendments to the ACLS are being developed.

The paper summarizes the development hardware status.