

HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)
New Technologies, Processes and Operating Modes Enabling Future Human Missions (7)

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TOTAL WATER RECYCLING SYSTEM DEVELOPMENT FOR FUTURE MANNED SPACE
MISSION

Abstract

ECLSS (Environmental Control and Life Support System) is one of the most important parts for manned space missions. Especially for Regenerative ECLSS system, it is only NASA and ROSCOSMOS that have a prolonged employment experience since 1960's. CSA, ESA and JAXA are cooperating with these two space powers for ISS program, but they have less experience for CO₂ removal, O₂ generation, or environmental monitoring function such as atmosphere composition monitoring which is essential for human to survive. JAXA has been operating JEM as a part of ISS, JAMSS (Japan Manned Space Systems Corporation) also support its JEM operation, but unfortunately JEM doesn't have these kinds of function. So we JAMSS has started a "Total Regenerative ECLSS system" development based on our almost five-year's operational experience. This technology will surely be able to be contributed to Japanese original manned spacecraft. This paper will introduce current topic, status, lessons learned in ISS Regenerative System and our system development status. Our development first stage focuses on "air revitalization" and "water recovery" system. The air revitalization includes CO₂ removal, O₂ generation, trace contaminant control, atmosphere composition monitoring and so on. On the other hand, water recovery system means reclaiming humidity condensate, waste hygiene, or urine into portable water) or other recycling usage. We promptly aim to establish the highest reliable regenerative ECLSS system with cost saving in the world for space system by combining existing system efficiently.