

# Maintaining Adequate CO<sub>2</sub> Washout for an Advanced EMU via a New Rapid Cycle Amine Technology

Cinda Chullen<sup>1</sup>

*NASA Johnson Space Center, Houston, TX, 77058*

*and*

Bruce Conger<sup>2</sup>

*UTC Aerospace Systems, Houston, TX, 77058*

Over the past several years, NASA has realized tremendous progress in Extravehicular Activity (EVA) technology development. This has been evidenced by the progressive development of a new Rapid Cycle Amine (RCA) system for the Advanced Extravehicular Mobility Unit (AEMU) Portable Life Support Subsystem (PLSS). The PLSS is responsible for the life support of the crew member in the spacesuit. The RCA technology is responsible for carbon dioxide (CO<sub>2</sub>) and humidity control. Another aspect of the RCA is that it is on-back vacuum-regenerable, efficient, and reliable. The RCA also simplifies the PLSS schematic by eliminating the need for a condensing heat exchanger for humidity control in the current EMU. As development progresses on the RCA, it is important that the sizing be optimized so that the demand on the PLSS battery is minimized. As well, maintaining the CO<sub>2</sub> washout at adequate levels during an EVA is an absolute requirement of the RCA and associated ventilation system. Testing has been underway in-house at NASA Johnson Space Center and analysis has been initiated to evaluate whether the technology provides exemplary performance in ensuring that the CO<sub>2</sub> is removed sufficiently and the ventilation flow is adequate for maintaining CO<sub>2</sub> washout in the AEMU spacesuit helmet of the crew member during an EVA. This paper will review the recent developments of the RCA unit, testing planned in-house with a spacesuit simulator, and the associated analytical work along with insights from the medical aspect on the testing.

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<sup>1</sup> Project Engineer, Space Suit and Crew Survival Systems Branch, Crew and Thermal Systems Division, 2101 NASA Parkway, Houston, TX 77058/EC5, Senior Member.

<sup>2</sup> Project Manager, Thermal and Environmental Analysis, 2224 Bay Area Blvd., Houston, TX 77058/JE-5EA.