SERFE Project Overview

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NASA has been developing a new spacesuit, called the Exploration Extravehicular Mobility Unit (xEMU) for over a decade. This spacesuit is underdevelopment to support missions to the International Space Station (ISS) and also to the Moon. Improvements in the life and robustness of the Portable Life Support System (PLSS) has been a major objective of these efforts. The Suit Water Membrane Evaporator (SWME) was chosen as the technology to provide cooling to the xEMU and has undergone several iterations of development over this period. An ISS flight experiment centered around the SWME and other thermal loop technologies was developed and has been under test in an ISS EXpedite PRocessing of Experiments to the Space Station (EXPRESS) rack since November of 2020. In addition to the SWME, The SWME EXPRESS Rack Flight Experiment (SERFE) contains several technology demonstrations from the xEMU project and has been demonstrating their performance in micro-gravity and over an extended duration. This paper summarizes the design and operation of the SERFE experiment and provides a basis for subsequent papers to focus on more specific aspects of performance of individual technologies.

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