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USE OF VOLUMETRIC ADDITIVE MANUFACTURING (VAM), AS AN IN-SPACE MANUFACTURING (ISM) TECHNOLOGY.

Abstract

In-Space Manufacturing (ISM) is a critical component of space exploration that enables the rapid fabrication of components to replace or repair broken parts, allows for manufacturing of tools, and fabrication of life saving organic tissue. Previously there have been individual machines that have tackled parts of this problem, such as FFF printing technology seen in Made-In Space's Advance Manufacturing Facility (AMF), or Tech-Shot's BioFaBrication Facility (BFF). A recent breakthrough in additive manufacturing technology called Computed Axial Lithography (CAL), can accomplish all these tasks in a single machine. CAL functions by solidifying parts in an enclosed vial of material, this process does not produce any layers as in other processes, as the parts made with this process form all at once. CAL has been demonstrated to manufacture organic tissue, flexible seals, rigid trusses, and micro structures. In an experiment CAL will demonstrate all of these capabilities in a microgravity environment via a parabolic flight. This flight conducted in May 2022 with results expected shortly after will serve to demonstrate the wide capabilities of this printing process in a microgravity environment and its usefulness as an ISM technology.