

Additive Manufacturing Facility (AMF)

Infusion

The Additive Manufacturing Facility (AMF) started as a Small Business Innovative Research (SBIR) project proposed by the company Made in Space, Inc. (MIS) and was infused into the International Space Stations (ISS) Program. The AMF was installed in the ISS EXPRESS Rack in April, 2016, and will offer on-demand manufacturing capability to NASA, and be accessible to industry, academia, and other government agencies through the ISS National Laboratory and the Center for the Advancement of Science in Space (CASIS).

The AMF uses an extrusion-based additive manufacturing process, more commonly known as "3D printing", to manufacture parts up to 14cm x 10 cm x 10 cm, with three different types of polymers to choose from. In addition to multiple parabolic flights through NASA's Flight Opportunity Program, the additive manufacturing process was tested in microgravity for the first time in 2014 on the ISS 3D Printing in Zero-G Technology Demonstration, which was also made possible by a SBIR between NASA and Made in Space, Inc. This technology demonstration served as a critical pathfinder and risk mitigation for this novel process to be tested in the space environment.



The Made in Space, Inc. Additive Manufacturing Facility (AMF) provided on-demand manufacturing of parts for NASA, as well as commercial users.

Benefit

Long-term exploration missions to destinations such as Mars require a dramatic paradigm shift in logistics, maintenance, and repair. In-space manufacturing offers the elegant solution for sustainability and affordability by developing the on-demand processes, such as additive manufacturing, to address the in-space construction, repair, and maintenance of vehicles, critical systems, habitats, and uncrewed spacecraft for long-duration missions. This "Make it, Don't Take It" approach allows for a variety of parts and systems to be manufactured on-demand, directly lowering cost and decreasing risk by making available a needed part or tool in the time it takes to print. The AMF serves as an ideal "machine shop in space" technology test-bed for the evolution of this capability.

Development Team Leads

Mike Snyder was the lead designer from MIS, Inc. for the AMF.

Niki Werkheiser was the project manager for NASA's In-space Manufacturing initiative.

Lead NASA Center: Marshall Space Flight Center (MSFC)

Funding Organization: Human Exploration and Operations Mission Directorate (HEOMD)/Advanced Exploration Systems

For more information: <https://techport.nasa.gov/view/11874>