

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Advanced Systems, Technologies, and Innovations for Human Spaceflight (7)

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ESA METAL 3D , THE 1ST METAL ADDITIVE LAYER MANUFACTURING EXPERIMENT IN
SPACE

Abstract

Additive Manufacturing (AM - also referred to as 3D printing) is a fast evolving and very competitive technology domain which is revolutionising the approach to conceiving and manufacturing parts. When considering space exploration missions, such a technology will allow realisation of in-orbit manufacturing and repair as well as new designs, tailored to a micro/reduced gravity environment (i.e. without launch loads). This may entail a major departure from how design, pre-flight qualification and testing is performed today for space hardware. While initiatives have recently materialised to install and operate 3D printers on the ISS, these are currently limited to using polymers. ESA has recently awarded a contract for an ISS demonstrator of metallic additive layer manufacturing to Airbus DS and its partners Poly-Shape, Cranfield University and Highftech. The objective of this activity is to develop an AM Machine that will demonstrate the capabilities of this technology to perform metal deposition in 3D under sustained microgravity conditions and manufacture test specimens. The demonstrator will be developed as a sub-rack payload for the European Drawer Rack Mark II (EDR MKII) in the Columbus Laboratory on board the International Space Station. The technology demonstrator will be based on commercial-off-the-shelf technologies and is currently planned for a flight to the ISS in late 2019. Metal 3D should be the first 3D printing experiment with metals to operate in space. The project team will present the activity in details and will report on the progress made up to IAC 2018.