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IMPLEMENTATION OF 3D SCANNING AND 3D PRINTING TECHNOLOGIES IN
ASTRONAUTICAL AND SPACE EXPLORATION APPLICATIONS. THE DIGITAL
TELEPORTATION REVOLUTION.

Abstract

Additive manufacturing has the potential to positively affect human spaceflight operations by enabling the in-orbit manufacture of replacement parts and tools, which could reduce existing logistics requirements for the International Space Station and future long-duration human space missions. This report evaluates the prospects and importance of development 3D scanning and 3D printing in space exploration. The specific benefits and potential scope of additive manufacturing remain undetermined. The realities of what can be accomplished today, using this technology on the ground, demonstrate the substantial gaps between the vision for additive manufacturing in space and the limitations of the technology and the progress that has to be made to develop it for space use. 3D Scanning and 3D Printing technologies have the power to not only bring qualitative improvement to the way humanity explores its next frontier but can also change the way we think about space exploration. This report attempts to shed light on the current prospects of 3D scanning technology in space and investigate its potential for future medium and long-term development and applications. While the particular scope of the benefits of using this technology are hard to predict, even the current, perhaps underdeveloped, capabilities of 3D scanning appear to secure it a place in the toolkit of options for space-based activities. This report provides prerequisites for future research and suggests opportunities for joint development.