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INNOVATIVE METHODS OF 3D PRINTING IN SPACE

Abstract

Currently used technology for additive manufacturing in a reduced gravity environment is far from being fully developed and utilised during deep space missions. Results are not convincing enough as printed samples vary in the quality and material characteristics and there is a huge potential for improvement. Micro Gravity Space Printer (or MG SPrinter) is a research project at the Czech Technical University in Prague that addresses some of the issues of 3D printing in space. The aim of the research is to develop and test a 3D printer capable of printing in a reduced gravity environment using an innovative method involving a ferromagnetic composite material and printing in a variable magnetic field. Such method can influence material characteristics of printed components hence increasing the usability of 3D printing in space. Ultimately it can lead to decrease in cost of deep space missions as an excessive and weighty amounts of spare parts would be replaced by an efficient and reliable 3D printer (that uses the examined method) and a volume of a printing material. During several phases of the experiment, this printer will be used for printing in both space (using a sounding rocket) and Earth environment; the paper focuses on introduction and first results of the aforementioned 3D printer.