

SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 3 (2C)

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ROBOTIC PROTOTYPES FOR THE SOLAR SINTERING OF REGOLITH ON THE LUNAR
SURFACE DEVELOPED WITHIN THE REGOLIGHT PROJECT

Abstract

Future missions to the Moon will require the utilization of the local resources in order to make them affordable. The EU-funded RegoLight project advances existing 3D printing technologies and methodologies for the purpose of shaping lunar regolith, a readily available resource on the Moon's surface, through the means of concentrated sunlight that sinters the material, making it solid.

An electromechanical feeder system operating in ambient conditions inside a solar simulator has been developed in the context of the RegoLight project as well as the software chain enabling the conversion of building blocks in CAD format, into printing paths for the robotic elements. Two further systems are being developed, a TRL5 3D printer capable of operating in vacuum and dusty conditions, and a

TRL4 mobile printing head capable of sintering regolith simulant, as a proof of concept of a system to be deployed on the Moon.

Challenges include the correct transportation and deposition of the granular material, the dusty environment affecting mechanical and optical components, and systems exposed to high temperatures in vacuum conditions. Lessons learned from the engineering of these prototype robotic systems are shown.