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Author: Mr. Mehmet Fatih Engin  
University of Turkish Aeronautical Association, Türkiye

Ms. Beril Durmaz  
University of Turkish Aeronautical Association, Türkiye

Mr. Doruk Demirci  
University of Turkish Aeronautical Association, Türkiye

Mrs. Nurgül Ünlüel  
University of Turkish Aeronautical Association, Türkiye

Ms. Fatma Buse Alkan  
University of Turkish Aeronautical Association, Türkiye

Ms. Elif Ercan  
University of Turkish Aeronautical Association, Türkiye

Mr. Abdulkadir Ulusoy  
University of Turkish Aeronautical Association, Türkiye

Mr. Celal Gündüz  
University of Turkish Aeronautical Association, Türkiye

Mr. Burak Samet Kaya  
University of Turkish Aeronautical Association, Türkiye

## THE CONCEPTUAL SYSTEM ANALYSIS OF THE LUNAR CONSTRUCTION MISSION

### Abstract

In-Situ Resource Utilization (ISRU) is the harnessing of local natural resources at mission destinations, instead of taking all needed supplies from Earth, to enhance the capabilities of human exploration that can reduce mission and architecture mass and costs, and increase safety for crew and mission success. Along with the rapid development of space technology, extraterrestrial exploration has gradually tended to further-distanced and longer-termed planet exploration. As the first step of an attempt for humanity to build a perpetual planet base, building a lunar base by ISRU will drastically reduce the reliance on supplies from Earth. For this reason, space agencies and commercial companies are still working on 3D Printing in construction systems on the Moon. Furthermore, many methods that are being discussed in construction. Selective Laser Melting Method, when compared to other methods of 3D Printing that can be applied on the Moon, is considered to be advantageous in terms of weight, easy to use, and therefore is preferred as a result of comprehensive trade-off.

In this paper, a pioneering conceptual system analysis describes the Lunar In-Situ Resource Utilization Construction Mission aim of which is to carry out 3D Printing in construction by using laser based on fundamental requirements which are as follows:

- The system shall land on the Moon.
- The system shall provide data of analyzed regolith to the Earth.
- The system shall have rover to carry out 3D Printing in construction activities of the Moon.

- 3D Printing process shall be controllable on the Earth.