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Space Architecture: Habitats, Habitability, and Bases (1)

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SPACE TOURISM AND SPACE ARCHITECTURE. CONSTRUCTIVE STRATEGIES USING IN SITU LUNAR RESOURCES TO BUILD A HOTEL ON THE MOON.

Abstract

As a result of advances in space exploration there has been an increase in interest in space tourism. Man since ancient times has been fascinated by the cosmos and its wonders and began to study them, trying to understand the laws that govern it. Over time the desire to explore space became more insistent and found representation in novels as Jules Verne's From the Earth to the Moon and then in science fiction films Stanley Kubrick's 2001: A Space Odyssey. These representations have helped to the advancement of space exploration by going on to encourage a new vision of space. In recent years we have seen Virgin Galactic, Space X, and Blue Origin initiate tourism voyages outside the Earth's atmosphere, but with the new Artemis missions, the boundaries that are slated to be touched are expanding. This study will focus on Moon's tourism, going to propose a vision of tourism that will present similarities with the terrestrial one, going to study the characteristics of the accommodations on Earth, such as those that have developed in Italian vernacular cities, like Matera, to guarantee the maximum comfort to the tourists. A mixed design is proposed with a part of the structure developing inland and a part on the lunar surface, where the foyer of the accommodation structure will be located and will be the center of the attractive activities. Bringing people to the Moon for short periods is one of the first steps in the creation of colonies in the long term that NASA is taking an interest in. However, when we go to build on pristine land, we have to take into account the environmental and geological characteristics of the site to have as little impact on the land as possible, so we have to go and implement the technologies that we know to preserve the site. The use of Additive Layer Manufacturing (ALM) methodologies in combination with In Situ Resource Utilization (IRSU) strategies is proposed. The regolith from the excavation process can be exploited for the construction of the foyer dome, which will need to have precise construction characteristics to counteract solar radiation and to resist possible meteorite impacts. The research phase will be based on the study of projects of lunar and Martian colonies, existing literature and then proceed with the design part through computational modeling programs and the analysis of the technical performance of the structure.