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Human Exploration of Mars (2)

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URBANIZATION OF MARS USING MARTIAN RESOURCES. ARCHITECTURAL AND
CONSTRUCTIVE SOLUTIONS FOR LIVING AND WORKING SPACES ON MARS.

Abstract

"With the increasing interest in space exploration, the question of colonizing Mars is becoming increasingly relevant. One of the important aspects of this process is the development of architectural and structural solutions for constructions on Mars before and after its settlement. Our goal is to present plans for implementing these constructions using Martian resources, which will reduce the costs of transporting resources from Earth and increase construction efficiency. The proposed constructions include living quarters, scientific research facilities, large colonial structures, and infrastructure for agriculture. The facilities will be both underground and aboveground. In short, our aim is to present architectural and structural solutions for constructions on Mars using Martian resources. Mars has a considerable amount of resources, chemical elements that humanity currently utilizes in industry. These may include iron, aluminum, sulfur, calcium, and so on. Additionally, Martian regolith contains water. In short, by using these and other elements on Mars, it is possible to produce iron, steel, glass, plastics, and even construction mortar. For example, the results of the Viking mission showed that Martian soil contains a very high amount of calcium (about 5% But Mars is not Earth, and conditions there are much harsher. There is low temperature, weak gravity, more radioactivity due to lower atmospheric density, and so on. However, we will address solutions to all these problems from the architectural and structural standpoint for the facilities. In short, we will present more precise plans for facilities, all possible methods of construction, and solutions to all problems associated with this topic. I want to mention that the inspiration for these studies for me as an architect was Robert Zubrin's project 'Mars Direct,' and I want to explore this topic as deeply as possible and contribute to the colonization of Mars."