

Space Studies of the Earth-Moon System, Planets, and Small Bodies of the Solar System (B)
Mars Exploration (B02)
Consider for oral presentation.

**ARCHITECTURAL CONCEPTS OF MARTIAN BASES BUILT: OF DOMES,
AROUND GREENHOUSES AND INTO SLOPES - THE HUMAN ASPECT AND
THE TECHNOLOGY**

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Human missions to Mars are a special kind of space missions due to their long duration. The human aspect of such missions becomes as important as the technological one. The need for a human friendly and comfortable habitat arises. Studies of human behavior in ICEs have shown that larger groups of people mean a lower occurrence of conflicts. However, for a larger crew a larger habitat has to be designed – a Martian base.

The research deals with psychological, sociological and technological aspects influencing the architectural design of a Martian Base. Extreme conditions present on Mars demand a particular approach to technological and architectural design. To reduce the cost of building a bigger habitat, low cost solutions have been inquired into. A series of analyses has been performed to identify the best architectural solutions for a Martian base. A review of existing technologies and extreme condition habitats (both terrestrial and extraterrestrial) has revealed solutions that are the most reliable and efficient ones. Additionally, innovative technologies have been analyzed in search of the best candidates for actual base construction. Low cost solutions have been prioritized in the process.

An in-depth study of architectural problems inherent in the design of a Martian base has resulted in a number of guidelines for the architect. The main ones are introduced in this review. Based on them, several concepts have been drafted as examples of user-friendly and aesthetically pleasing habitats. They are discussed in the following order: habitats made of domes, those built around greenhouses and those situated in sloping terrain. One of them is presented in detail, including interior design.