

HABITAT ARCHITECTURAL DESIGN SYSTEM (HADS), PROPOSED MODULE FOR LUNAR HABITAT. Payam Bahrami¹ and Dr. Mahjoub Elnimeiri², ¹Illinois Institute of Technology (S.R. Crown Hall, 3360 S. State Street, Chicagi, IL 60616 – pbahrami@iit.edu), ²Illinois Institute of Technology (Elnimeiri@iit.edu).

Introduction: The future lunar missions will involve long-term human presence on the moon. We must endeavor to provide a habitability environment for the lunar crew which should be safe, pleasant place to live and productive place to work. There are many challenges to design lunar habitat, such as technical and functional problems, human physiological and psychological needs, engineering, science and logistics operations. A number of concepts have been proposed for lunar settlement that most focus has been on developing structure systems.

Habitat Architectural Design System (HADS): This paper offers HADS for human habitation. HADS is the combination of science and engineering investigations within design aspects. It will provide a guideline dependent upon mission objectives to standardize architectural needs within engineering application and scientific demands. It has been shown which involving architects and designers in the early stage of space project have many benefits.

The significance of such a system is that HADS helps to integrate human being and technology from the beginning to develop lunar habitat. It will enhance crew productivity and performance quality, and will optimize safety and reliability as well (Fig 1).

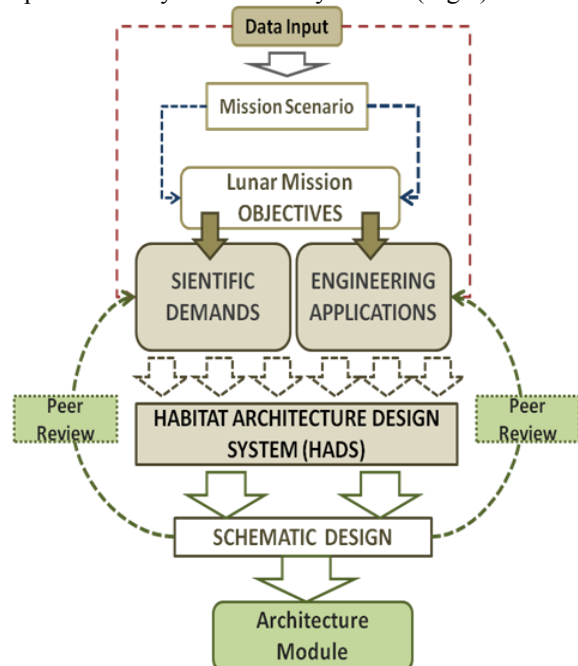


Fig 1: Habitat Architecture Design System (HADS) process through mission scenario

HADS is proposed to set up new approaches in the long-duration stay on the moon. It is a kind of system which act to translate scientific language to the design language. The outcome of HADS will be understandable for space engineer and scientist, and it would enhance collaboration between architect, engineer and scientist to provide a livable habitat on the moon.

The system is like hardware and each member is acting like software in their own area. The result will establish a flexible lunar habitat to accommodate a wide range of activities. The operation objectives defines approach; scientific and engineering outputs resolve technical and some functional issues. All these information are inputted to the system, and then HADS provides two procedures for them; HABITABILITY CRITERIA and EVALUATION to review and integrate schematic design for lunar habitat. This is the methodology of the system (Fig 2).

In addition the design teams need to be multidisciplinary and include among others, engineers, architects, scientists, industrial designer, psychologists, physiologists, and cognitive experts.

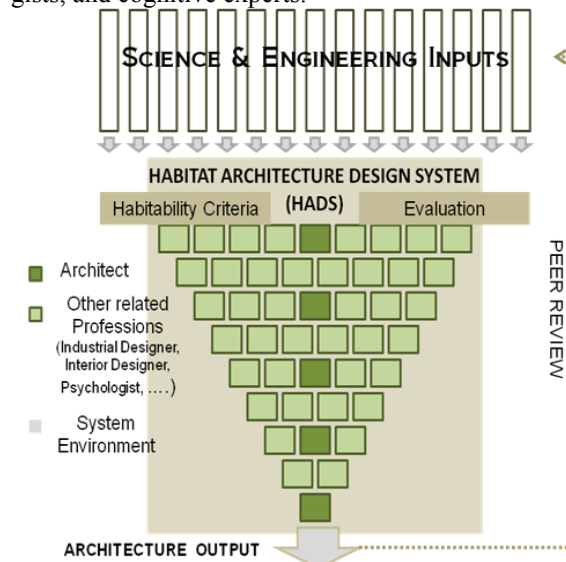


Fig 2: Habitat Architecture Design System (HADS) Diagram

References:

- Larry Toups, Kriss J. Kennedy (2008), Constellation Architecture Team-Lunar, Lunar Habitat Concepts, NASA/ JSC
- Ian O’Neill (2008), Building a moon base.