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HUMAN EXPLORATION OF THE SOLAR SYSTEM SYMPOSIUM (A5)
Human Exploration of the Moon and Cislunar Space (1)

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CONCEPTUAL DESIGN OF A HUMAN PLATFORM IN CIS-LUNAR SPACE IN THE YEAR 2020/2025

Abstract

With the dawn of the private space sector, access to low Earth orbit and cis-lunar space is becoming more and more reliable and affordable. Reorganization of established structures, allows space agencies to focus on deep-space exploration. A step-by-step approach to space exploration as envisioned in the Global Exploration Roadmap suggests "commercial or government-owned platforms". Although, dedicated development of such platforms is not evident but required as they constitute the first step of a larger architecture. In the context of the 2015 Space Station Design Workshop (SSDW) at the Institute of Space Systems (IRS), a mission scenario was determined. Two teams comprised of students and young professionals are going to tackle the challenging design task in a five-day workshop, guided by experts from industry and academia. Methodology and software tools to support the undertaking have been developed at the IRS over the last 15 years, and will be discussed in different publications. This paper will present and evaluate two competing conceptual designs resulting from the SSDW. The scope of which is the design of a manned platform in cis-lunar space. Besides the support of future human space exploration activities, the platform is required to enable in-orbit integration, servicing and maintenance of a variety of space systems. Novel applications in Earth's proximity such as debris removal, space tourism and in-situ resource utilization shall also be under consideration of the design teams. Moreover, after the decommissioning of the ISS, a possibility for technology demonstration and microgravity research shall be sustained. Starting with a vaguely formulated mission statement and task description, the teams will identify the focus of the platform autonomously. Its design should offer flexibility through a modular design, which enables the separation and recombination of modules. International cooperation shall benefit from lessons-learned on the ISS and split up contributions between nations based on functionality rather than the design of separate modules. Another major emphasis of the workshop is to identify possible contributions and the role of Europe.