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THE INTEGRATIVE DESIGN APPROACH TO LUNAR SETTLEMENT

Abstract

The MoonVillage vision that has been actively communicated by Dr. Johann-Dietrich Wörner of ESA has inspired many of the world's space leaders and private companies to establish a permanent base beyond Earth. But what does it take to settle on other celestial bodies? Although the space industry is generally seen as exclusive to rocket scientists, space colonization presents a challenge of immense scale that transcends disciplines. We must think beyond science and engineering, and take a more integrative and interdisciplinary approach to consider multiple facets of lunar settlement including architecture, sociology, politics, law, psychology, design, economics, philosophy and even religion.

This paper presents the importance of adopting the Integrated Design Approach (IDA) in space education, a discovery process that brings all elements and entities associated with a project from the early on in the process in order to reduce potential risks, and come up with efficient and effective solutions. To explore the significance and the potential role of the IDA in the space industry, the paper presents a detailed analysis of two lunar settlement workshops that have successfully adopted the IDA. These include "*Lunar City Design Hackathon*", a workshop that brought together architects, geologists and college students in Tokyo, Japan in August 2015 to design a lunar habitat, and "*Space Horizons 2016: International City on the Moon*", a student-focused 3-day integrative workshop that was held at Brown University in February 2016 that explored the development of a lunar city from four aspects: Infrastructure, BusinessEconomics, Science and Politics. In both workshops, the IDA has proven to be highly effective, engaging some of the non-space students and professionals in the discussion of lunar colonization to explore new perspectives and innovative approaches to lunar settlement.

The future of space is in widening the community. The IDA, if introduced globally, could accelerate the development of a diverse workforce in the space industry, and ultimately help mankind extend its presence beyond the planet.

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