

Full Moon: Storage and Delivery of Oxygen and Hydrogen for Lunar Exploration

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Abstract. Lunar exploration has changed considerably since the Apollo era. The key question driving lunar exploration is no longer "How do we get there?" but "How do we stay there?" In Situ Resource Utilization (ISRU) of oxygen and hydrogen are essential to sustainable lunar exploration for both propulsion and life support. However, the ISRU chain is not yet fully developed. While extraction and production methods are well documented, little work has been published on making oxygen and hydrogen easily accessible to end users. This technical proposal is one of the first attempts to bridge the gap in the oxygen and hydrogen supply chain.

This paper addresses the gap in lunar ISRU by proposing a system architecture for the storage and delivery of oxygen and hydrogen on the Moon. The proposed architecture aims to maximize user utility. It stems from characterization of the market demand and accommodates the constraints of the lunar environment and proposed production methods. Next, the paper discusses the system implementation from business and legal standpoints. In particular, methods for incorporating the burgeoning private space sector into a framework currently dominated by national space agencies are examined. Changes to the existing legal framework are then suggested as project enablers. The paper concludes with key recommendations for future steps.



FIGURE 1. *Full Moon* Project Team, ISU Masters 2007

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PRINCIPAL AUTHOR'S BIOGRAPHY

The *Full Moon* Team Project is an interdisciplinary group of 29 students from 19 countries in the International Space University 2007 Masters program. The team conducted an extensive literature review on lunar resources, then concentrated on a report to fill the identified research gap. This papers' authors contributed by summarizing the graduating team's work.