

BUSINESS INNOVATION SYMPOSIUM (E6)  
Entrepreneurship and Investment for Commercial in-Space Activities (2)

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THE BUSINESS CASE FOR MINING HE-3 FROM LUNAR REGOLITH

**Abstract**

Helium-3, a by-product of the nuclear weapons industry, is used in radiation portal monitoring systems for neutron detection. Since September 11, 2001, demand for He-3 for neutron detectors has increased steadily. At the same time, nuclear weapons production has decreased—thus suppressing the source of He-3. Over the last decade, the U.S stockpile of He-3 has fallen from 235,000 liters to approximately 50,000 liters. Due to the impending shortage, there is a high level of interest in identifying methods for obtaining He-3 through other sources or replacing it altogether in neutron detection. .

Working with technical staff from Teledyne Brown and Dynetics, we evaluated the feasibility of mining Helium-3 (He-3) from lunar regolith. Representatives from Teledyne Brown and Dynetics provided the investment and operations costs for a hypothetical mission to obtain 20,000 liters of He-3 yearly by robot mining of the lunar regolith. The UAH team developed several scenarios that modeled demand for He-3, alternative sources of He-3, competing technologies and other uses – and offered a tool for modeling these same questions under changing conditions. Given current and most likely conditions, lunar mining is not an economically feasible solution for addressing the He-3 shortage. However, the report documents information about other options that could potentially increase the He-3 supply.

This study serves as template for future lunar mining missions. Commercial space is not an area that has been extensively explored in the United States due to lack of government funding. The current decrease in appropriated space exploration funds is generating interest from commercial investors. Because the United States has not traditionally viewed space as a commercial business, it is imperative that we develop frameworks, such as this, to study the feasibility of future privately funded space missions.