

17th IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE (D4)  
Space Resources: Technologies, Systems, Missions and Policies (5)

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DEVELOPING THE FRAMEWORKS, PROCESSES AND TECHNIQUES TO EVALUATE THE  
COMMERCIAL VIABILITY OF OFF-EARTH MINING PROJECTS

**Abstract**

Growing interest from both the private and public sectors, to expand current robotic and human activities on The Moon and eventually Mars, has resulted in a need to find low-cost energy solutions, capable of meeting the near-term and future market demands of an emerging cis-lunar and Martian in-space economy. The extraction, production and sale of local volatile resources from the Lunar and Martian surface has the potential to meet these demands but only when it is commercially viable to do so. For an off-earth mining project to be successful, a company must find, produce and sell the desired commodity at a profit. Endeavors of this kind, as is also seen in the terrestrial extractive industries, carry substantial financial risk, particularly in the early stages when a project has both large geological and development uncertainties. It is now becoming critically important, as the off-earth mining industry advances, to develop the right processes and frameworks to communicate uncertainties and risk in prospective off-earth mining projects, in order to encourage investment and reduce market uncertainty. The current absence of an agreed upon framework for reporting resource and reserve estimates and established terminology standards to reference these potential resources, is prohibitive to clear communication and transparency. By undertaking a thoughtful approach, which takes into account the unique geological, technological, economic, political and legal environments in which these activities will take place, this study provides recommendations for the development of an off-earth resource and reserve estimation framework. This study also discusses some of the challenges that will be faced in doing so. Establishing guidelines of this kind will enable effective communication between stakeholders and facilitate robust decision-making to take place at all stages of investment, both in the present day and into the future as the industry matures.