

22nd IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM (A5)
Human Exploration of the Moon and Cislunar Space (1)

Author: Ms. Jessy Kate Schingler
Open Lunar Foundation, United States

Mr. Jacob Guglin
Massachusetts Institute of Technology (MIT), United States
Ms. Mehak Sarang
Massachusetts Institute of Technology (MIT), United States
Ms. Ariel Ekblaw
Massachusetts Institute of Technology (MIT), United States

LUNAR MISSION TECHNOLOGY AND STANDARDS REVIEW: TOWARDS INTERNATIONAL
COLLABORATION AND SAFE, SECURE DEMOCRATIZATION OF LUNAR ACCESS

Abstract

Access to space is becoming more democratized, as growing competition in the launch market continues to drive down costs. Ramifications in satellite-based industries are myriad, and are changing the business of space at a rapid pace. The same forces driving these changes are poised to reinvigorate all areas of space, with major attention already shown to the next phase of lunar industry. How the “business of the moon” will unfold however remains a mystery, as various players, from governments to large companies and startups, build plans for the future. This paper proposes to categorize lunar strategies in order to create a deeper understanding of the near, medium and long term components of the lunar economic landscape. Categories for this review analysis include: agent type, motivation, landing and operation location, technical difficulty of the endeavor, mission ConOps, funding models, and timing. With this information, industry players and observers will be better equipped to understand the opportunities and challenges in the lunar market in the years to come.

Results from this categorization will then be compared and emergent “common themes” identified as the precursors for international lunar standards and precedent-setting. While competition between governments for business, resources, and technology will necessarily form a central part of lunar expansion, it is the near-universal hope of the space community that this healthy competition never transitions into conflict. Regardless of business concerns, the safety of astronauts, and eventually civilians, will be the top priority of governments. As the level of activity on the moon and in cislunar space increases, central to this safety effort will be the ability of astronauts and rovers from any country to come to the aid of someone in peril. Maritime law and the Outer Space Treaty lay a groundwork for the legal obligation to act, however, given the highly engineered nature of any interaction in space, a robust set of technical and interoperability standards are necessary as well. Without such standards, astronauts from one country may find themselves in a position where they can reach, but cannot render aid to, another explorer. This paper will analyze current efforts to create standards, and propose a new framework integrating proven strategies from prior international, engineering-focused, standards making bodies (e.g. W3C, ITU, IEEE, etc). By understanding these efforts—where they are succeeding and where they are failing—we can develop a roadmap to implement collaborative, interoperable lunar mission strategies.