



# An ICAO for the Moon: It's time for an International Civil Lunar Organization

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The United States has an opportunity to lead in the responsible, peaceful, and sustainable exploration and use of outer space through the opportunity to lead centers around the projected increase in activity on and near the Moon. According to the State of the Space Industrial Base 2021, a variety of nations and their companies are planning more than 100 missions to the Moon in the next decade, and noted that more than 140 companies have “lunar” or “cislunar” in their business plans. More recently, Citigroup has estimated that by 2040, Moon mining could be worth \$12 billion in annual sales. As noted by the recent World Economic Forum report, the space sector has reached an inflection point where commercialization is beginning to outpace governance.

What could help? The same World Economic Forum report notes the need to create and implement effective space governance, including the establishment of new international institutions to develop and promulgate common standards. What might it look like?

Imagine an international organization that fosters the planning and development of international lunar space transportation and operations to ensure their safe and orderly growth. The organization would adopt standards and recommended practices concerning navigation infrastructure, inspection, and prevention of unlawful interference. It would facilitate procedures for crossing of international zones of activity as well as establish protocols for accident investigation.

There is already a model for such an organization. The above paragraph was adapted nearly word-for-word from the description of the International Civil Aviation Organization, or the ICAO. The ICAO is the international organization that has presided over the phenomenal and successful growth of commercial aviation by developing and promoting voluntary standards and best practices. Unlike other international aviation groups, such as trade groups, the ICAO alone is vested with international authority.

Is there a need for such an organization? After all, there are a diversity of voluntary organizations attempting to facilitate roadmaps and norms of behavior. Some, such as the International Space Exploration Coordination Group (ISECG) are agency-to-agency, and are not designed to facilitate the safe and orderly growth of commerce. Some volunteer organizations work with both state and non-state actors to achieve consensus (CONFERS, MVA, OpenLunar, IISL, IAF, or SRGWG), but lack the authority analogous to an ICAO to promulgate standards and recommended practices.

What sorts of things could be facilitated by such a body? All manner of standards and operating practices that contribute to the safety and orderly growth of a cislunar economy and its lines of commerce.

Its duties would include facilitating safe lunar landing, takeoffs, ascent into orbit, and transit of cislunar lines of commerce. It would establish standards for landing pad construction, safety offset distances, emergency communications frequencies, message formats, and when notifications must be made. It might specify transition or hand-off altitudes for space domain awareness and space traffic management, such as those concerned with landing (analogous to approach and tower control in aircraft) and those that manage in-space traffic (analogous to radar control).

Like the ICAO, it would focus on creating standards and recommended practices (SARPs). The ICAO publishes an Aeronautical Information Publication (AIP) that standardizes units, message formats, standards for atmospheric pressure, temperature, density, and transition altitudes. An International Civil Lunar Organization (ICLO) could standardize units for speed, distance, message formats, and transition altitudes.

Like the ICAO, it would be active in infrastructure management, communications, navigation, surveillance, and traffic management. It would include interoperable standards for navigational aids, airlocks, gas and fluid transfer (for life support, fueling, and industrial purposes), and electrical power standards such as voltage, frequency, and plug types.

Promoting such standards would reduce uncertainty and catalyze the rapid development of infrastructure and enable a broader diversity of actors to interact with key infrastructure for landing, navigation, communication, and power.

Clear interoperable standards will contribute to rapid commercial growth, speeding the broader end-states of making available critical resources for sustainable development, the greening of Earth, the tackling of climate change, and the security of life beyond Earth.

ICAO is a proven model that has enabled enable consensus and convergence upon, and dissemination of, best practices that enhance safety and reduce the possibility of harmful interference for aviation. A similar model can do the same for space, and without the bitter pill of necessitating states to give up their sovereignty and subordinate their lunar activities to a seabed-like authority, such as required by the more idealistic and failed model of the Moon Agreement.

But would such an institution reflect the concerns of developing nations as well as support the needs of the leading spacefaring states? A recent Space Generation Advisory Council (SGAC) Fusion Forum highlighted the importance of inclusion in building a long-term governance system that represented all possible stakeholders and could sustain legitimacy, especially in the eyes of countries just beginning to consider space, yet also represent the interests of commerce which seeks to serve the sustainable development needs of Earth.

It turns out the ICAO has already pioneered an approach to equity and inclusion that balances three separate interests. The ICAO elects 36 members every three years from three different groups: those nations of chief importance due to the scale of their aviation programs, those who are large contributors to the ICAO itself, and lastly those from geographic regions regardless of wealth, impact, or contribution. Major decisions are taken by 19 commissioners nominated by contracting states who serve as independent experts, not as representatives of their states.

Clearly, ICAO provides a workable model to pragmatically advance space governance for a cislunar economy. Given the close analogy, should this be housed within the existing ICAO? Definitely not. Space is distinct. Its physics is different. Its legal regime is different. Its major actors, contributors and involved regions are likely to be different. These are all compelling reasons to set up an International Civil Lunar Organization (ICLO) using the model of the ICAO, but as a new standalone institution.

Given that the United States has committed to a sustainable lunar presence, and committed to promoting norms, the United States should take leadership in an ICLO. Such leadership worked out well for the United States in aviation. The United States was an early leader in ICAO, helping establish the global order of international aviation that ended up benefitting both the United States as well as its aerospace industry. Having articulated a compelling interest in promoting norms for responsible, peaceful, and sustainable exploration and the use and development of space, the US should build upon the success of the Artemis Accords and propose an ICLO to set positive conditions for a cislunar economy.