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The Commercial Exploitation of Mineral Resources in Outer Space

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What legal framework is needed to support commercial mining in outer space?

- Commercial ventures require:
 - Orderly exploration and recovery
 - Stability and predictability over time
 - *Investment protection*
- Does current space law provide sufficient certainty for profit-driven activity

The Legal Concept of a “Miner’s Right”

- On Earth, mining often operates without ownership of the land itself
- Instead, ventures may hold a *usufructuary* right
- This means:
 - A right to use property, for a particular purpose, over a certain time period
 - A right to take its fruits or resources
- A similar concept is being developed for space resources

The Outer Space Treaty (OST)

- The OST is the foundational legal framework for space activities
- It has 116 parties, including all major space powers
- Often described as the Magna Charta or Constitution of space law
- It sets out broad principles, but many provisions remain open to interpretation
- Generally favorable to commercial activities

Under OST, Space is:

- To be used for the *common benefit* of all countries; Free for use and exploration (Art 1)
 - The Freedom of Use Principle
- Not subject to appropriation by claim of sovereignty, by means of use or occupation, or by any other means (Art 2)
 - The Non-Appropriation Principle

Other Highly Relevant Principles:

- Parties are responsible for national space activities, including those of private actors. *Authorize & Supervise* (Art 6)
- Avoid *harmful Interference* (Art 9)
- Conduct activities with *Due Regard* to interests of other nations (Art 9)

How to resolve tension between art 1 & 2

- Freedom of *use*, but
- May not appropriate by *use* ...

Vienna Convention On The Law Of Treaties 1969

- *The Text*: The written words are viewed as the most authentic expression of the intent
- Subsequent *Practice and Agreements*: how the Parties have actually applied the treaty over time

Nations with Relevant Legislation:

- US: Commercial Space Launch Competitiveness Act (2015)
 - Grants US entities the right to own, use, and sell resources they extract from space
 - US specifically does not assert sovereignty, exclusive rights, jurisdiction, or ownership of any celestial body

Other Nations with Similar Laws:

- Luxembourg (2017)
- UAE (2019)
- Japan (2021)
- *Italy* (2025)
- *Brazil* (2025)

Customary International Law:

- To establish a rule of customary international law, the international legal system requires two core elements. Both must be present.
 - 1) General and Consistent *State Practice* (the *objective* element)
 - 2) *Opinio Juris* (the *subjective* element) - belief by states that the practice is legally required, not just habitual or convenient.

The Artemis Accords

- A set of non-binding principles introduced in 2020 for cooperation in the use of space for peaceful purposes
- Designed to guide *civil* space exploration
- As of May 2026, *67 countries* have signed
- Includes most space powers - not Russia & China

The Artemis Accords

- Each Signatory commits to taking appropriate steps to ensure that *entities acting on its behalf* comply with the principles of these Accords. Sec. 2

Artemis Accords: Relevant Principles

- Transparency in operations
- Interoperability of systems
- Emergency assistance
- Registration of space objects
- Open sharing of scientific data
- Mitigation of orbital debris
- Safe and sustainable conduct in space activities

Section 10: Space Resources

- Extraction and use of space resources should be done in compliance with the OST
- *Extraction of space resources does not constitute appropriation under Article II*
- Use experience under the Accords to contribute to multilateral efforts to further develop international practices on the extraction and use of space resources

Section 11: Deconfliction of Space Activities

- Signatories agree to:
 - Provide public information on the location and nature of operations
 - Coordinate activities to prevent *harmful interference*
 - Establish *temporary* **safety zones**
- Safety zones should be:
 - Scientifically based
 - Limited in size, scope, and duration
 - Consistent with free access and due regard principles

MOUs Under the Accords – Section 2 on Implementation

- Cooperative activities regarding the use of outer space may be implemented through appropriate instruments, such as MOUs or other instruments.

UNOOSA Working Group on Space Resources

- Will the legal recommendations or rules of the road that are about to come out next year from UNOOSA's working group on space resources influence your thesis and conclusions?

Moon Base Perimeter?

- How about the “perimeter” that NASA wants for its Moon base? These measures are starting to sound more like “keep-out zones” instead of just “safety zones”.

Main Argument on Mining Rights

- Mining resources is not an appropriation
- Mining is an exercise of the OST's freedom of use
- A full claim of title likely would violate the OST and is not necessary
- A limited, temporary, resource/use-specific exclusive right is legally defensible - *usufructuary* right



Conclusion

- Commercial space resource extraction is legally supportable under the OST
- The Artemis Accords help supply the predictability investors need and are a legitimate interpretation of the OST
- That predictability will be further developed in MOUs, etc. between nations and companies capable of exploiting mineral resources in outer space
- Go forth and mine!