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Enterprise Rights and the Legal Regime for Exploitation of Outer Space Resources

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Enterprise Rights and the Legal Regime for Exploitation of Outer Space Resources

Leslie I. Tennen, Esq.*

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I. INTRODUCTION

“The International Law of Property,” by Professor Sprankling, traces the historical nature and future direction of property rights in international law.¹ He should be congratulated for this ambitious undertaking and commended for his many insights. In his excellent discussion of property in space, Professor Sprankling has examined issues that are at the forefront of modern international law, as the *corpus juris spatialis* is dynamic and evolving as the commercial space age develops.² The following discussion will focus on one aspect of property in space: private enterprise and the resources of the Moon and other celestial bodies.

Space is a unique medium with attributes unlike any physical area on Earth. As such, it requires an approach that is also unique, one that is not burdened with the historical shackles of terran-based legal regimes. The regulation of

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1. JOHN G. SPRANKLING, *THE INTERNATIONAL LAW OF PROPERTY* (2014).

2. *Id.*

commercial space activities will be developed with its own frame of reference and specialized terminology, in physical and legal concepts. To be effective, the legal regime must be able to protect the interests of all parties concerned with the exploration and use of outer space. This includes states as well as non-governmental entities, such as the public, the private sector, the scientific community, and academia. Laws that provide predictability, transparency, and enforceability are key to the peaceful development of the commercial space age. The space treaties currently in force establish many of the fundamental parameters of commercial space regulation, and domestic law regimes provide, and will provide, additional components.

II. OUTER SPACE AND INTERNATIONAL LAW

The primary international legal instrument, which governs the activities of mankind in space, is the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies.³ The Outer Space Treaty was developed through the United Nations Committee on the Peaceful Uses of Outer Space and entered into force in 1967. More than 125 nations have signed or ratified the treaty, and four additional treaties specifically relating to outer space have supplemented its provisions.

The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space provides for aid and assistance to distressed astronauts, and for the return of personnel and objects that come into the jurisdiction of states.⁴ The Convention on International Liability for Damage Caused by Space Objects establishes rules and procedures for compensation for damages caused by space objects on the surface of the Earth, to aircraft in flight, and to objects in outer space.⁵ The Convention on Registration of Objects Launched into Outer Space requires states to maintain a national register of objects launched into outer space and to provide the Secretary-General of the United Nations with specific information on such objects for inclusion in an international register.⁶ The fifth space treaty in force is the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, which contains

3. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 (entered into force Oct. 10, 1967) [hereinafter Outer Space Treaty].

4. Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968, 19 U.S.T. 7570, 672 U.N.T.S. 119 (entered into force Dec. 3, 1968).

5. Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 (entered into force Sept. 1, 1972) [hereinafter Liability Convention].

6. Convention on Registration of Objects Launched into Outer Space, Jan. 14 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15 (entered into force Sept. 15, 1976) [hereinafter Registration Convention].

specific provisions regarding the use of extraterrestrial resources.⁷ Although it was opened for signature in 1979 and entered into force in 1984, the Moon Agreement has been ratified by only sixteen states and signed by an additional four, which does not include the United States, Russia or China. Nevertheless, the Moon Agreement is part of the *corpus juris spatialis*, and it may be applicable in particular situations.⁸

The space treaties establish a comprehensive set of rules to guide mankind in the peaceful exploration and use of outer space. Primary among these rules are that activities in space are to be conducted in conformity with international law.⁹ Furthermore, outer space, including the Moon and other celestial bodies, is the province of mankind and shall be used for peaceful purposes only.¹⁰ Astronauts are considered to be “envoys of mankind.” Military installations, stations, and maneuvers are prohibited on celestial bodies, as is the “testing of any type of weapons.”¹¹ Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all states without discrimination, and there shall be free access to all areas of celestial bodies. Moreover, states are internationally liable for their national activities in space.¹² The *corpus juris spatialis* contains numerous provisions that have direct application to commercial ventures in space resources.

III. THE NON-APPROPRIATION DOCTRINE

Article II of the Outer Space Treaty is at the epicenter of any discussion concerning the use and exploitation of the resources of outer space. It provides:

7. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 5, 1979, 1363 U.N.T.S. 3, 18 I.L.M. 1434 (entered into force July 11, 1984) [hereinafter Moon Agreement].

8. The Moon Agreement is a treaty between more than a dozen nations that entered into force pursuant to its internal provisions, and it continues to attract new signatories. Parties and signatories to the treaty include states that represent more than one-sixth of the Earth’s population, and include both states with independent space capability, as well as member states of the European Space Agency (ESA). Although the ESA is not an organizational party to the treaty, member states of ESA that are party to the Moon Agreement must be certain that their participation in any mission, directly or indirectly, is consistent with their international agreements and obligations. In addition, and significantly, India has signed the Moon Agreement and launched, and is currently conducting an independent mission to Mars. Thus, activities directly subject to the Moon Agreement are being conducted by a state that is a signatory to the international agreement. The pendency of ratification of the treaty by India does not detract from the binding nature of the Moon Agreement, as states are obliged to refrain from acts that would defeat the object and purpose of a treaty upon signature. Vienna Convention on the Law of Treaties, art. 18(a), May 23, 1969, 1155 U.N.T.S. 331 (entered into force Jan. 27, 1980) [hereinafter Vienna Convention].

9. See, e.g., Outer Space Treaty, *supra* note 3, at arts. I–III (noting that space exploration and use should be conducted “in accordance with international law”).

10. See, e.g., *id.* at art. IV (“The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes”).

11. *Id.* at arts. IV–V.

12. *Id.* at arts. I, VI.

“Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”¹³

This non-appropriation doctrine was among earliest declarations of the community of nations at the beginning of the space age—the General Assembly unanimously adopted it in 1961.¹⁴ Article II of the Outer Space Treaty was reaffirmed and restated in Article 11.2 of the Moon Agreement. The prohibition on national appropriation in space has received widespread acceptance and has represented state practice for more than fifty years. As such, it has become customary international law that is binding on all states, whether or not they are a party to the Outer Space Treaty or the Moon Agreement.¹⁵

The operative phrase of Article II prohibits national appropriation of “outer space, including the Moon and other celestial bodies.”¹⁶ What, then, is a celestial body? The term is not defined in any of the space treaties. The scientific community, acting through the International Astronomical Union, adopted definitions of celestial bodies in 2006.¹⁷ Within the solar system and its environs, the IAU recognizes the following celestial bodies: the Sun; the planets; the Moon of Earth and the moons of other planets; Near-Earth Objects; dwarf planets; trans-Neptunian objects; asteroids; comets; and Kuiper belt objects.¹⁸ Within the context of the *corpus juris spatialis*, all of these objects would be considered celestial bodies subject to the non-appropriation doctrine. Of course, it is possible that by future international treaty or other agreement, certain objects or categories of objects will be the subject of a specific instrument with special rules and regulations.¹⁹ However, unless and until such specific instrument enters into force, all of the natural bodies within the solar system that may be reached by an object launched from Earth should be considered as a celestial body subject to the Outer Space Treaty.

The non-appropriation doctrine prohibits claims of national appropriation of celestial bodies, but does not prohibit the commercial use of extraterrestrial resources. The manner in which the resources of the Moon and other celestial bodies can be used and exploited has generated a considerable amount of controversy. Those who advocate for the assertion and recognition of some form

13. *Id.* at art. II.

14. International Co-operation in the Peaceful Uses of Outer Space, G.A. Res. 1721 (XVI), ¶ A(1)(b), U.N. Doc. A/RES 1721(XVI) (Dec. 20, 1961).

15. Vienna Convention, *supra* note 8, at art. 38.

16. Outer Space Treaty, *supra* note 3, at art. II.

17. Int'l Astronomical Union [IAU], *Definition of a Planet in the Solar System*, IAU Doc. RES/B5 (2006).

18. *Id.*

19. The provisions of the Moon Agreement also apply to other celestial bodies unless specific agreements are entered into regarding such other bodies. Moon Agreement, *supra* note 7, at art. 1.1.

of terran real property estates on the Moon or other celestial bodies have been especially critical of the non-appropriation doctrine.²⁰

The focus on “property rights” in space, in the sense of traditional real property law, is misplaced. First, it does not substantively address the legitimate interests of entrepreneurs that require legal protection in order to conduct business. Second, claims of ownership of areas of celestial bodies or resources in place are irrelevant to commercial products or services derived from those areas and resources. Third, such claims are unnecessary to protect commercial ventures on celestial bodies. Fourth, imparting traditional forms of property rights to space, especially fee simple types of claims, violates the non-appropriation principle. Such forms of property rights would only be relevant where there is an intention to profit from the alienation and conveyance of the fee simple claim and/or subsidiary interests derived therefrom.²¹

IV. ENTERPRISE RIGHTS IN SPACE

The criticism of the non-appropriation doctrine fails to recognize that this central principle of space law is essential to the creation of an environment in which the commercialization of extraterrestrial resources can be conducted *ab initio*.²² The *corpus juris spatialis* protects the exercise of commercial rights in space consistent with the prohibition against national appropriation.²³ The rights of entrepreneurs to conduct business in space relate to the legal ability to use and exploit extraterrestrial areas and materials for commercial gain. These are “enterprise rights,”²⁴ not ownership rights. Professor Sprankling correctly described the protected interest to be in the nature of a usufruct.²⁵ There are numerous instances where commercial ventures utilize natural resources without a concomitant claim of ownership of the physical area or location. Examples include offshore oil platforms, grazing rights, logging rights, and, as Professor Sprankling discussed, satellite orbits.²⁶

The formulation of specific parameters for enterprise rights in extraterrestrial resources will be based, in part, on the particular circumstances of the resources. That is, no one set of regulations will be appropriate for all resources in all

20. Wayne N. White Jr., *Real Property Rights in Outer Space*, in PROCEEDINGS OF THE 40TH COLLOQUIUM ON THE LAW OF OUTER SPACE 370 (1998).

21. Kenneth M. Weidaw III, *A General Convention on Space Law: Legal Issues Encountered in Establishing Lunar and Martian Bases*, in PROCEEDINGS OF THE 47TH COLLOQUIUM ON THE LAW OF OUTER SPACE 272, 275–77 (2005).

22. Leslie I. Tennen, *Towards A New Regime for Exploitation of Outer Space Mineral Resources*, 88 NEB. L. REV. 794 (2010).

23. *Id.*

24. *Id.*

25. SPRANKLING, *supra* note 1, at 181–83, 189.

26. *Id.* at 191–92.

circumstances. The intended use, relative abundance or scarcity, location of the resources *in situ*, and whether the celestial body itself is movable are all factors that may influence the course of regulation. A broad array of uses will emerge, but in accordance with Article II, there is no right to exclusive occupation of an area of space or celestial bodies in perpetuity.²⁷ Thus, the non-appropriation doctrine directly promotes space commerce, as it prevents any entity from claiming a monopoly on an area or resource.

Far from being an impediment to space commerce, the non-appropriation doctrine makes the commercialization of space possible. Throughout history, the discovery of a new territory was immediately followed by a claim of national sovereignty over the area. This claim could take the form of a physical presence, planting a flag, or other rituals. While the manner of asserting claims by states may have differed, the one attribute they shared was that claims of sovereignty ultimately were recognized and enforced on the basis of military power. The launch of Sputnik I presented the global community with new and profound national security implications. As the first nation to launch a satellite into Earth's orbit, the Soviet Union was in a position to follow historical precedent and assert claims of sovereignty resulting from the flight of Sputnik.

The U.S.S.R. was also the first nation to reach near-Earth orbits, cislunar space, and the surface of the Moon, and could have claimed vast areas of the cosmos as sovereign Soviet territory. Inevitably, these claims would have been met with resistance, and other states would have made conflicting and competing sovereignty claims. The threat to international peace and security would be significant, and ultimately, disputes over claims could result in military confrontation. The world chose a different approach: a mere four years after Sputnik, the UN General Assembly recognized the *res communis* nature of space and declared that outer space and celestial bodies are not subject to national appropriation.²⁸

The non-appropriation doctrine was elevated to treaty status with the entry into force of the Outer Space Treaty in 1967. In these early years of the space age, the international community also declared that outer space was to be explored and used for peaceful purposes only, in conformity with international law, and prohibited military facilities, installations, and maneuvers in space.²⁹ The primary attribute of these provisions, taken together, is the maintenance of outer space for peaceful purposes.³⁰ Thus, the *corpus juris spatialis* established an

27. CLARENCE WILFRED JENKS, *SPACE LAW* 201 (1965); VIRGILIU POP, WHO OWNS THE MOON? EXTRATERRESTRIAL ASPECTS OF LAND AND MINERAL RESOURCES OWNERSHIP 49–58 (2008); Ernst Fasan, *Asteroids and Other Celestial Bodies—Some Legal Differences*, 26 *J. SPACE L.* 33, 33 (1998).

28. International Co-operation in the Peaceful Uses of Outer Space, G.A. Res. 1721 (XVI), ¶ A(1)(b), U.N. Doc. A/RES 1721(XVI) (Dec. 20, 1961).

29. Outer Space Treaty, *supra* note 3, at arts. I, III, IV.

30. *Id.* at art. IV.

environment where both the public and private sectors can conduct activities without the necessity for military defenses or fortifications.³¹ This is a tangible benefit of space law.³² The alternative would have been an atmosphere of insecurity where the cost of conducting missions would increase in direct proportion to the defensive planning, armaments, and weaponry deemed necessary for the protection of personnel and spacecraft.

There are some who seem to take this benefit of space law for granted and urge that claims of various descriptions are permissible notwithstanding the non-appropriation doctrine. Often, these advocates base arguments on the absence of the word “private” from Article II of the Outer Space Treaty. Thus, they assert, the Outer Space Treaty prohibits national, i.e. governmental appropriation, but not appropriation by non-governmental entities, i.e. the private sector.³³ This argument must fail for several reasons.

Article II prohibits “national” appropriation.³⁴ The term “national” is defined in Article VI of the Outer Space Treaty to include activities that are conducted by governmental as well as non-governmental entities.³⁵ Thus, a claim of appropriation, even if made by a non-governmental entity, is nonetheless a national activity, and is thereby prohibited by Article II. While Article VI recognizes that non-governmental entities have a role in conducting activities in space, states are internationally responsible for the activities of their nationals in space. Moreover, pursuant to article VI, non-governmental entities are subject to the authorization and continuing supervision of the appropriate state. States are unable to authorize their non-governmental entities to conduct activities that international law prohibits the state, itself, from conducting.³⁶

The process of state authorization and continuing state supervision provides an opportunity for the development and supplementation of regulation of commercial activities in space. The Outer Space Treaty does not designate any specific form of legal regime to be adopted by states for the purpose of providing authorization and continuing supervision of their private entities. States can adopt any form of domestic regulatory oversight they deem appropriate and consistent with their national interests and policies, subject to international treaty obligations. At least fifteen nations have enacted legislation for the authorization

31. Patricia M. Sterns & Leslie I. Tennen, *Institutional Approaches to Managing Space Resources*, in PROCEEDINGS OF THE 41ST COLLOQUIUM ON THE LAW OF OUTER SPACE 33 (1999).

32. *Id.* at 35, n. 11 (citing statement by Eilene Galloway).

33. White Jr., *supra* note 20.

34. Outer Space Treaty, *supra* note 3, at art. II.

35. *Id.* at art. VI.

36. JENKS, *supra* note 27, at 201; H.L. van Traa-Engelman, *Clearness Regarding Property Rights on the Moon and Other Celestial Bodies*, in PROCEEDINGS OF THE 39TH COLLOQUIUM ON THE LAW OF OUTER SPACE 38, 42 (1997); P. Sterns et al., *Preliminary Jurisprudential Observations Concerning Property Rights on the Moon and Other Celestial Bodies in the Commercial Space Age*, in PROCEEDINGS OF THE 39TH COLLOQUIUM ON THE LAW OF OUTER SPACE 50, 56 (1997); Tennen, *supra* note 22, at 806.

of private activities in space.³⁷ Common provisions of national authorization regimes include the examination of a license application for potential liability concerns, any inconsistencies with national security interests, and compliance with the international obligations and policies of the state.³⁸ States usually require a licensee to obtain insurance,³⁹ although the state is internationally liable for damages which exceed the amount of insurance coverage.

States are under a continuing duty to supervise the activities of their nationals in space. Article VIII of the Outer Space Treaty provides that the state whose registry carries an object launched into outer space retains jurisdiction and control over said object and any personnel thereof while in space or on a celestial body.⁴⁰ Accordingly, objects launched into space, astronauts, and other personnel of a spacecraft remain subject to the jurisdiction and laws of the registry state notwithstanding their presence in space or on a celestial body. The applicability of domestic laws has been extended to space, including laws relating to intellectual property and the chain of command for personnel of a spacecraft.

It has been suggested that states could unilaterally establish a domestic registry to document their nationals' claims to space resources. Purportedly, this would be consistent with the non-appropriation principle if the state issued a proclamation that this registration scheme is "not to be appropriation." In making this proclamation, "the nation could make it clear that it was not claiming sovereignty over such resources, but simply recognizing the claims of its citizens."⁴¹ This is a distinction without a difference. State recognition of claims to extraterrestrial property by its nationals is national appropriation "by any other means" prohibited by Article II, no matter what euphemistic label is employed to mask the obvious.⁴² Moreover, the recognition of claims is only one side of the equation—the other side is the exclusion or rejection of any competing or conflicting claims. The *de facto* exclusion, by its very nature, would constitute a form of national appropriation.

Since Article II does not permit private appropriation of space and celestial bodies, it can be contended that the non-appropriation doctrine should be abrogated. Nevertheless, it is questionable whether such action would, in fact, benefit the space commercialization cause. Abrogation of the non-appropriation

37. For an examination of these national regulatory regimes, *see generally* NATIONAL REGULATION OF SPACE ACTIVITIES (R. Jakhu, ed. 2010).

38. *See, e.g.*, Commercial Space Launch Act, 49 U.S.C. § 70105(a) (West 2006); *see also* Paul Stephen Dempsey, *United States Space Law: Commercial Space Launches and Facilities*, in PROCEEDINGS OF THE 49TH COLLOQUIUM ON THE LAW OF OUTER SPACE 69, 73 (2007).

39. JULIAN HERMIDA, LEGAL BASIS FOR A NATIONAL SPACE LEGISLATION 20–21 (R. Jakhu ed., 2004).

40. Outer Space Treaty, *supra* note 3, at art. VIII.

41. *Id.*; Pat Dasch et al., *Conference on Space Property Rights: Next Steps*, in PROCEEDINGS OF THE 42ND COLLOQUIUM ON THE LAW OF OUTER SPACE 174, 178 (2000).

42. Outer Space Treaty, *supra* note 3, at art. II.

principle would result in assertions of competing and overlapping claims to various orbits, the Moon, and other areas of space and celestial bodies, including retroactive claims. As noted above, the Russians would have historic justification for claiming vast reaches of near-Earth space. Other technologically advanced nations—including the United States, China, France, Great Britain, India, and others—could assert claims to any area or location where the claimant had any basis for asserting that it was first to “discover” the subject of the claim, whether by means of exploration, use, landing, imaging, mapping, surveying, telepresence, or otherwise.

Enforcement of conflicting and overlapping claims would ultimately depend on military means, creating a significant risk of hostilities on Earth and exporting armed conflict into space. Even if military engagement could be avoided, states claiming an area could impose substantial fees and charges in the form of taxes, royalties, duties, auction fees, or other costs, even where claims overlap. Thus, more than one state could levy such forms of imposed tribute. Furthermore, the introduction of “private appropriation” to the mix would convolute the situation even more. The ability of all states to explore and utilize celestial bodies would no longer be a right per Article I of the Outer Space Treaty, but rather, it would be a commodity available only to the highest bidder—an inherently anticompetitive environment. Therefore, it is not a foregone conclusion that abrogation of the non-appropriation principle would be beneficial for entrepreneurs in space; the cost of doing business would increase significantly for acquiring and protecting rights to occupy and use space resources, and for physically protecting facilities from interference or attack.

The Outer Space Treaty recognizes the right of states to establish facilities, stations, and other installations in the exploration of space and celestial bodies.⁴³ The Moon Agreement recognizes the right of states to collect and remove samples, and to utilize minerals and other substances in support of missions.⁴⁴ The establishment of a facility on a celestial body, by itself, does not constitute a claim of appropriation, as neither the Outer Space Treaty, nor the Moon Agreement simultaneously authorize and prohibit the same activity.

The utilization of extracted resources presents a more complex issue. The Outer Space Treaty recognizes the right to establish facilities in the *exploration* of outer space, including celestial bodies, but does not expressly extend that same right to the *use* of outer space, including the Moon and other celestial bodies. Similarly, the Moon Agreement limits collecting samples and using resources to the support of scientific investigations.⁴⁵ For the foreseeable future, virtually all missions will have some aspect of scientific investigation, although they will not

43. Outer Space Treaty, *supra* note 3, at art IV.

44. Moon Agreement, *supra* note 7, at art. 6.2.

45. *Id.*

necessarily be limited to exploration. The question is whether a mission must have a designated percentage of scientific functions to qualify for the use of extraterrestrial resources.

The Moon Agreement contains numerous provisions that are broadly termed and includes missions conducted for reasons other than pure scientific investigation.⁴⁶ Both the Outer Space Treaty and the Moon Agreement repeat terms that may not have significant substantive differences in different contexts, such as “equipment or any facility necessary,” as compared to “equipment,” “facilities,” “stations” and “installations.” Certain treaty provisions may contain an express reference only to “explorations” or “use,” but the context makes it clear that the operative substance is to apply to all missions. Thus, the language and context of the treaties authorize the use of extraterrestrial resources for other purposes in addition to purely scientific investigations.

V. THE MOON AGREEMENT AND THE COMMON HERITAGE OF MANKIND

The most detailed and extensive provisions in any treaty relating to the use of extraterrestrial resources are set forth in Article 11 of the Moon Agreement. This article restates the non-appropriation doctrine, and expressly provides that no part of the Moon, its surface, or subsurface, nor resources in place, shall become property of any governmental or non-governmental entity, including natural persons.⁴⁷ This elaboration of the non-appropriation doctrine is not a substantive departure from, but rather a clarification of, Article II of the Outer Space Treaty. However, the Moon Agreement significantly departs from the Outer Space Treaty in the remainder of Article 11, which declares the Moon and its resources to be “the common heritage of mankind,” and obligates states to “undertake to establish an international regime . . . to govern the exploitation of the resources of the Moon as such exploitation is about to become feasible.”⁴⁸

The Moon Agreement does not obligate states to establish the international regime—it only requires that states, in good faith, undertake to establish the international regime.⁴⁹ It is possible that such an undertaking may fail to result in the establishment of an international regime. Significantly, the Moon Agreement also does not expressly impose a moratorium on the use of lunar resources pending the establishment of an international regime.

It is clear that some form of legal regime will need to be developed to regulate the exploitation of lunar and celestial resources, whether or not it is the

46. See generally *id.* at arts. 2 (exploration and use), 4 (accord), 7 (accord), and 8 (landing on and launching space objects from the Moon, and placing facilities and personnel anywhere on or below the surface).

47. Compare Moon Agreement, *supra* note 7, at art. 11, with Outer Space Treaty, *supra* note 3, at art. II.

48. Moon Agreement, *supra* note 7, at art. 11.5.

49. *Id.*

“international regime” referenced in the Moon Agreement. Article 11.7 identifies the main purposes of the international regime as: “the orderly and safe development of the natural resources of the Moon; the rational management of those resources; [and] the expansion of opportunities in the use of those resources.”⁵⁰ In the abstract, these purposes are neither unreasonable nor controversial. An international legal regime—whether or not it is developed pursuant to Article 11—can also serve as a means to establish priorities, adjudicate disputes, and provide appropriate notice to and among entities conducting activities on celestial bodies. The international legal regime could be further utilized for other purposes, such as protecting the environment, enforcing licensing and authorization of private entities, establishing outer space traffic rules, and other political or humanitarian goals.⁵¹

The Moon Agreement identifies one such goal in article 11.7(d):

An equitable sharing by all States Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the moon, shall be given special consideration.⁵²

The declaration that the Moon and its resources are the “common heritage of mankind,” subject to a mandatory sharing of benefits,⁵³ is the primary reason why the Moon Agreement has not received widespread acceptance since it was opened for signature more than thirty-five years ago.⁵⁴

The legal implications of the “common heritage of mankind” *vis-a-vis* celestial resources are yet to be determined. Nonetheless, the *corpus juris spatialis* establishes the fundamental elements of the legal regime of commercial space. Together with the domestic regimes for authorization and continuing supervision, significant protections are provided for space entrepreneurs. These protections eliminate the justifications for private appropriation claims and provide a means to enforce enterprise rights without resorting to military conquest.

50. *Id.* at art. 11.7.

51. Aldo Armando Cocca, *Property Rights on the Moon and Celestial Bodies*, in PROCEEDINGS OF THE 39TH COLLOQUIUM ON THE LAW OF OUTER SPACE 9, 11, n. 12 (1997) (citing L. Szalóky, *The Way of the Further Perfection of the Legal Regulation Concerning the Moon and Other Celestial Bodies, Especially Regarding the Exploitation of Natural Resources of the Moon and Other Celestial Bodies*, in PROCEEDINGS OF THE 16TH COLLOQUIUM ON THE LAW OF OUTER SPACE 196, 198 (1974)); Henri A. Wassenbergh, *The International Regulation of an Equitable Utilization of Natural Outer Space Resources*, in PROCEEDINGS OF THE 39TH COLLOQUIUM ON THE LAW OF OUTER SPACE 138, 140 (1997).

52. Moon Agreement, *supra* note 7, at art. 11.7(d).

53. Outer Space Treaty, *supra* note 3, at art. IX.

54. Moon Agreement, *supra* note 7, at arts. 11.1, 11.7(d).

VI. PROTECTION OF ENTERPRISE RIGHTS IN SPACE

The justification for claims that private appropriation is necessary or desirable rests on two prongs: first, to give recognition to the right of the claimant to occupy an area and utilize resources; and second, to exclude others from occupying the same area. However, a claim of appropriation by itself is insufficient and ineffective to protect either of these interests. There is no assurance that any state would recognize the claim or be deterred from conducting its own mission to the claimed area.

The enterprise rights of space entrepreneurs, including the right to occupy an area without interference, are protected without the necessity of a claim of appropriation. Space activities are difficult, fraught with risk, and require large amounts of capital and lengthy time frames. Space entrepreneurs must receive authorization from their state of nationality.⁵⁵ A state that grants authority to a private entity is internationally responsible for the activities of that entity.⁵⁶ There are a limited number of entities that could potentially embark on a mission to interfere with an authorized private venture on the Moon or other celestial body: the state that granted the authority to the private entity; a private entity that is a national of the same state as the authorized entity; another state or a private entity of that other state; or rogue entities.

It is unlikely that a state that granted authorization to a private entity would purposely interfere with the activities of that authorized entity *in situ*. An authorizing state has a broad array of traditional means and mechanisms that it could utilize, if desired, to limit or restrict the private entity's actions, and which would be much less costly and considerably more efficient than launching a mission to conduct interference with activities on a celestial body. Moreover, these administrative and judicial remedies may all be pursued on Earth, as the private entity will continue to have a presence on this planet and be subject to the authorizing state's personal jurisdiction.

It would also be unlikely for an entity to interfere with another entity that is granted authority by the same state. An application or request for authorization to conduct a mission with clear intent to cause physical interference with an existing facility on a celestial body would have little chance of obtaining regulatory approval. The state itself would object to such a purpose. The entity operating the authorized facility certainly would object. In addition, members of the public and other interested groups and entities may have an opportunity to object to the second entity's request for authorization, pursuant to domestic administrative or judicial procedures.

55. Outer Space Treaty, *supra* note 3, at art. VI. Depending upon the specific parameters of a mission, authorization may be required from more than one state.

56. *Id.* arts. VI, VII; *see generally* Liability Convention, *supra* note 5.

It may be possible for a second entity to request a state to authorize a commercial mission in close proximity to a facility the state previously authorized. To the extent that the potential exists for interference to occur, which is recognized during the authorization process, the state can consult with the parties or otherwise provide an opportunity for them to be heard. And, after appropriate administrative or other procedures, they may deny the request or impose conditions, restrictions, or other requirements to prevent the potential for interference. Where interference occurs *in situ*, these same kinds of modifications can be made to the license or other grant of authority, which would be an appropriate implementation of the state's obligation to provide continuing supervision of its non-governmental entities in space. An aggrieved party could seek to invoke administrative or judicial procedures, including, in appropriate cases, provisional remedies or injunctive relief as available under domestic law.

Enforcement of an order by physical means against an entity *in situ* on the Moon or other celestial body would not likely be possible, at least not in the short term. Nevertheless, the means to enforce an order on the entity's Earth-based components are available pursuant to extant domestic laws, and can include revocation of the authority to conduct the commercial space operation, restrictions on communications links, cease and desist orders, injunctions, attachment of property, fines, currency and banking limitations, and, in proper cases, criminal charges. Where the interference is of a kind other than physical disturbance, such as infringement of intellectual property rights or unfair competition, disputes and claims arising therefrom would essentially be no different than the corresponding claims of these types raised and resolved on a daily basis on Earth according to existing domestic and international law. Even though a dispute may originate from an activity on a celestial body, the resolution process may well be conducted on Earth.

The potential for interference with a commercial space enterprise could come from the activities of other states or their nationals. Where a state is aware that activities it is planning may potentially cause harmful interference with the activities of another state, Article IX of the Outer Space Treaty requires that such state initiate consultations with the other state. Conversely, where a state conducting activities becomes aware that another state's activities could cause interference with its own activities, the first state may request the latter state to engage in consultations.⁵⁷ The Moon Agreement contains a corresponding procedure in Articles 5, 8.3 and 15.2, but it requires states to participate in consultations if another state requests.⁵⁸ A request for consultations is not restricted to bilateral discussions as other states may seek to join therein. Should interference occur, liability could be imposed pursuant to the provisions of the

57. *Id.*

58. Moon Agreement, *supra* note 7, at art. 15.2.

Outer Space Treaty, and, where applicable, the Liability Convention.⁵⁹ As with proceedings for domestic disputes, the diplomatic or other mechanisms for resolving controversies involving two or more states would be conducted on Earth.

States are able to regulate their national's exercise of enterprise through domestic processes and procedures pursuant to the obligation to authorize and continuously supervise the activities of non-governmental entities in space. In the performance of this duty, states can be expected to coordinate the authorized activities of entities to prevent harmful interference with each other, and with the activities of the state itself. Where more than one state is concerned or involved, the consultation procedures under the Outer Space Treaty and the Moon Agreement provide international recognition of authorized non-governmental entities' right to occupy a location on a celestial body and utilize the resources thereof.⁶⁰ The authorizing state will represent the interests and enterprise rights of non-governmental entities during the consultations. The non-appropriation doctrine prohibits reservations of areas and claims of a right to future occupancy. However, potential conflicts between different states' missions that are in the planning stage are nonetheless subject to consultations that should seek to coordinate both parties' activities and thereby avoid harmful interference between them.⁶¹

There is no guarantee, of course, that the consultations will successfully resolve the dispute. However, they are an appropriate mechanism to be utilized in the first instance. Moreover, while states are engaging in consultations to resolve a dispute, they are less likely to engage in belligerent and provocative activities *in situ*. Thus, the domestic authorization procedure and the international consultations framework provide significant protection for the right of authorized entities to occupy and utilize a celestial location. If a state was determined to interfere with another states' public or private entities in space and all available diplomatic and international procedures failed to resolve or diffuse the situation, it would signify a breakdown in international relations extending far beyond the specific space activity at issue.

It would be extremely difficult for a rogue entity to interfere with a facility *in situ*, but the possibility cannot be completely excluded. Should a rogue entity acquire the launch equipment or services, hardware, and other means and capabilities to conduct such a mission, it would not be deterred by a claim of appropriation by a private entity. Moreover, a proper response to the rogue entity would likely require coordinated participation by several nations.

59. Outer Space Treaty, *supra* note 3, at arts. VI, VII; Liability Convention, *supra* note 5, at arts. III, IV, V.

60. Outer Space Treaty, *supra* note 3, at art. IX; Moon Agreement, *supra* note 7, at art. 15.

61. Moon Agreement, *supra* note 7, at art. 5.

The regulation of enterprise rights in space is in the early stages of development, and there is still much to be done. The scope of existing domestic procedures for authorizing enterprise rights does not expressly extend to the conduct of activities on the Moon or other celestial bodies. States will need to draft laws and regulations for administrative agencies to have the authority to license these activities, such as the recent request of Bigelow Aerospace for guidance regarding a potential lunar mission, the ASTEROIDS Act, introduced in the United States Congress in 2014, or the SPACE Act of 2015.⁶² These domestic procedures must be consistent with the provisions of the space treaties, several of which have particular relevance to enterprise rights in addition to Article II of the Outer Space Treaty and Article 11 of the Moon Agreement.

A. *Right of Visitation*

The *corpus juris spatialis* protects a non-governmental entity's right to occupy a location on a celestial body, but this right is not unconditional. Article XII of the Outer Space Treaty provides that states have the right of visitation of all stations, installations, equipment and space vehicles on the Moon and other celestial bodies. This visitation right is an important mechanism for firsthand state representative observation to assist in determining whether activities are being conducted in compliance with international law. The Outer Space Treaty requires advance notice to ensure safe operation of the facility to be visited and to prevent interference, but does not require the visited entity to supply transportation to the facility.⁶³ Moreover, the Outer Space Treaty conditions the right of visitation on a "basis of reciprocity."⁶⁴ In Article 15.1, the Moon Agreement similarly provides for a right of visitation, although it does not require reciprocity.

B. *Duty of Disclosure*

The Registration Convention requires disclosure of specific information regarding objects launched into outer space, however, the obligatory disclosures are limited to data concerning the launch, registration number or other designation, location, general function, and, where applicable, basic orbital parameters of the objects.⁶⁵ The Moon Agreement requires certain disclosures at

62. Berin Szoka & Jim Dunstan, *Commentary, Space Property Rights: Here's Where to Start*, SPACENEWS (Jan. 27, 2014), <http://spacenews.com/39294space-property-rights-its-time-and-heres-where-to-start/#sthash.1BudbLTz.dpuf> (on file with *The University of the Pacific Law Review*); ASTEROIDS Act, H.R. 5063, 113th Cong. (2014); SPACE Act of 2015, Pub. L. No. 114-90 (2015).

63. Outer Space Treaty, *supra* note 3.

64. *Id.*

65. Registration Convention, *supra* note 6, at art. IV.

regular intervals for activities conducted on the Moon.⁶⁶ Article 5 provides that the Secretary-General of the United Nations shall be informed of the nature, conduct, locations, and results of activities in space, and the information is to be disseminated to the public.⁶⁷ States also are required to disclose “any phenomena they discover in space” or on the Moon that “could endanger human life or health, as well as any indication of organic life.”⁶⁸ These disclosure requirements could require states to take sufficient precautions to protect intellectual property, other business and trade secrets, and confidential information as much as possible.

While Article 6.2 of the Moon Agreement permits the collection, removal, and utilization of samples from the subsurface and surface, it further provides that states “shall have regard to the desirability of making a portion of such samples available to other interested States Parties and the international scientific community for scientific investigation.”⁶⁹ Thus, a private entrepreneur may be required to provide samples of extracted materials to other states for scientific investigation. The article does not require reimbursement of the cost of acquiring or extracting such samples.⁷⁰

C. *Environmental Protection*

Non-governmental entities will need to comply with Article IX of the Outer Space Treaty, which provides that states “shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination. . . .”⁷¹ In Article 7, the Moon Agreement expands on this directive and contains an affirmative obligation of states to “take measures to prevent disruption of the existing balance of [the celestial] environment, whether by introducing adverse changes in that environment, by its harmful contamination through the introduction of extra-environmental matter or otherwise.”⁷² The presence of humans or robotic spacecraft on a celestial body inevitably will cause some disruption to the pristine natural environment. However, the impact of human activity, especially involving mining or extraction of resources, must be limited as much as possible.

The Moon Agreement, Article 7.3, establishes that states “shall report to other States parties and to the [U.N.] Secretary-General concerning areas of the moon having special scientific interest in order that . . . consideration may be

66. Moon Agreement, *supra* note 7, at art. 5.

67. *Id.*

68. *Id.* at art. 5.3.

69. *Id.* at art. 6.2.

70. *Id.* at art. 6.

71. Outer Space Treaty, *supra* note 3, at art. IX.

72. Moon Agreement, *supra* note 7, at art. 7.1.

given to the designation of such areas as international scientific preserves for which special protective arrangements are to be agreed . . .”⁷³ For example, some have proposed to dedicate areas of the lunar far side for radio astronomy, as it is a zone uniquely shielded from transmissions emanating from Earth.⁷⁴ These protective arrangements are similar to the “special regions” in the planetary protection policy, which is especially concerned with the search for extraterrestrial life or its remnants or precursors.⁷⁵ These special regions are areas where it is believed that water, in the form of surface or subsurface ice, may be present. Spacecraft landing in a special region must achieve Viking-level sterility, even where the craft is not intended to conduct life detection experiments.⁷⁶ These special regions generally relate to Mars, although it is possible that areas of the Moon, particularly the poles or other areas where ice may be present, could be designated as special regions. The Moon Agreement provides that the designation of an area as an international scientific preserve is “without prejudice to the rights of other States Parties” to the treaty.⁷⁷ The designation as a special region, however, is a scientific and not a legal declaration. Nevertheless, enterprise rights could be limited or even prohibited in special regions as appropriate in specific factual settings.

VII. THE WAY FORWARD

The legal regime for commercial space is in the early stages of development. Many of the basic elements essential for space commerce are set forth in the existing space treaties and will be supplemented by future international agreements and regulation. National licensing regimes and other forms of domestic procedures for authorization and supervision of non-governmental entities in space further supplement the legal regime and provide a means for states to regulate private sector activities in compliance with their treaty obligations. Several developments in other realms of international law have relevance to enterprise rights and could be instructive as to the manner in which enterprise rights in celestial resources will be defined and enforced.

73. *Id.* at art. 7.3.

74. Claudio Maccone, *The Quiet Cone Above the Farside of the Moon*, 53 ACTA ASTRONAUTICA, 65, 65 (2002).

75. See generally Committee on Space Research, COSPAR Planetary Protection Policy, at A-5 (Oct. 20, 2002), available at http://science.nasa.gov/media/medialibrary/2012/05/04/COSPAR_Planetary_Protection_Policy_v3-24-11.pdf (on file with *The University of the Pacific Law Review*); Leslie I. Tennen, *Evolution of the Planetary Protection Policy: Conflict of Science and Jurisprudence?*, in PROCEEDINGS OF THE 45TH COLLOQUIUM ON THE LAW OF OUTER SPACE 466, 472 (2003), reprinted in 34 ADVANCES IN SPACE RES. 2354, 2360 (2004).

76. COSPAR Planetary Protection Policy, *supra* note 75.

77. Moon Agreement, *supra* note 7, at art. 7.3.

The Law of the Sea Convention, for example, was amended in 1994 to increase the representation of states commensurate with their interests in the governance of seabed resources, revise the mandatory disclosure requirements for private entities, and reform the governing International Seabed Authority such that it is no longer in direct competition with commercial entities.⁷⁸ It is noteworthy that the Law of the Sea Convention declared the resources of the seabed to be the common heritage of mankind. The position of the United States was that “the Agreement, by restructuring the seabed mining regime along free market lines, endorses the consistent view of the United States that the common heritage principle fully comports with private economic activity in accordance with market principles.”⁷⁹

In 1996, the U.N. General Assembly adopted the Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries.⁸⁰ The Declaration emphasized opportunity and focused on promoting and fostering international cooperation on an equitable and mutually acceptable basis.⁸¹ It did not mandate any particular format of cooperation between states, but rather, the concerned countries must determine which modes are most effective and appropriate.⁸²

The dispute resolution process of the World Trade Organization (WTO) was substantially revised in 1994.⁸³ These revisions “reflect a fundamental shift in the nature of international trade dispute settlement from a political, consensus-based process to a more legalistic system.”⁸⁴ The dispute resolution process accentuates the rule of law and enhances the predictability and institutional neutrality of the WTO.

These examples demonstrate that the common heritage of mankind principle does not impose an insurmountable burden to the private sector developing and exercising enterprise rights on celestial bodies. There is an international movement toward resolving disputes on the basis of the rule of law, rather than

78. Convention on the Law of the Sea, *opened for signature* Dec. 10, 1982, 1833 U.N.T.S. 3; Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, U.N.G.A. Res. A/RES/48/263 (Aug. 17, 1994).

79. LETTER OF TRANSMITTAL FROM PRESIDENT WILLIAM J. CLINTON, UNITED NATIONS CONVENTION ON THE LAW OF THE SEA, WITH ANNEXES, AND THE AGREEMENT RELATING TO THE IMPLEMENTATION OF PART XI OF THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA, WITH ANNEX, S. TREATY DOC. NO. 103–39, 103rd Cong., 2nd Sess., at 61 (Oct. 7, 1994).

80. G.A. Res. 51/122, U.N. A/RES/51/122 (Dec. 13, 1996).

81. *Id.*

82. *Id.*

83. Understanding on Rules and Procedures Governing the Settlement of Disputes, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 2, 1869 U.N.T.S. 401.

84. THE WORLD TRADE ORGANIZATION: THE MULTILATERAL TRADE FRAMEWORK FOR THE 21ST CENTURY AND U.S. IMPLEMENTING LEGISLATION 585 (Terence P. Stewart, ed. 1996).

by purely political and other considerations. This reliance on the rule of law provides stability and predictability and enhances opportunities for the private sector. The relationship and interplay between an international regulatory regime and domestic authorization and licensing regimes must await future development, including whether and to what extent the international regulatory regime will harmonize national authorization and licensing procedures and processes.

It is unclear whether the international regime that the Moon Agreement envisioned will be established, or whether some other form of international regulatory regime will emerge. Nevertheless, whatever course is taken, particular focus should be placed on the promotion of opportunity, as well as the rule of law, in the creation of any regulatory structure. There should be an emphasis on market principles. A flexible and evolutionary approach should be adopted, and international cooperation must be promoted. In the event there is a centralized organization created to act as an international regulatory body, the bureaucratic structure should be limited, and provide for appropriate representation of states commensurate with their interests. The international regime must not engage in unfair competition with the private entities subject to its regulatory authority. Similarly, provisions should require a neutral arbiter to aid in resolving disputes. Finally, the equality of opportunity must be preserved.