

Note

Interpreting the Outer Space Treaty's Non-Appropriation Principle: Customary International Law from 1967 to Today

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INTRODUCTION

SpaceX plans to have its first astronauts land on Mars by 2026.¹ Blue

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1. Neel V. Patel, *Elon Musk Unveils SpaceX's Timeline for Sending People to Mars: Will We See Humans on Mars by 2026?*, INVERSE (June 19, 2017), <https://www.inverse.com/article/33146-elon->

Origin wants to take tourists to space by April 2019.² The European Space Agency points to the possibilities of mining Helium-3 on the moon to provide cleaner energy here on Earth.³ Space tourism, exploration, and exploitation are very real possibilities in the near future—at least technologically. Legally, however, the way forward is less clear.

Under the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (commonly known as the Outer Space Treaty), no State has the right to claim as sovereign territory the moon or any other celestial body.⁴ Some critics see the Outer Space Treaty as merely an outdated relic from the Cold War era,⁵ but there are good reasons for maintaining the fundamental principles undergirding the law in its current form. If the Treaty were repealed or interpreted to allow a free-for-all, first-come, first-served method of allocating space property rights (as some have suggested either should, or will, happen),⁶ this would likely produce an extremely chaotic and unequal allocation of resources. Developing nations that currently lack space capabilities would be at a significant disadvantage relative to States possessing such capabilities, and the ensuing State actions would likely result in an unequal territorial grab leaving few, if any, resources for those nations technologically incapable of space exploration.

The international community is faced with the dilemma of balancing economic efficiency with equitable access.⁷ Different interpretations of the Outer Space Treaty may favor one of these principles over the other. With President Donald Trump's announcement on June 18, 2018, that he was directing the Pentagon to establish a Space Force, State action in space is likely to increase—be it shaped by the interests of individual nations or the interests of the international community.⁸ Thus, the stakes of an international agreement on the appropriate interpretation of the Outer Space Treaty are particularly high.

This Note traces the history of the non-appropriation principle from its inception in 1967 through today as States seek to strike the proper balance

musk-spacex-timeline-mars-mission-new-space.

2. Jackie Wattles, *Blue Origin CEO: We're Taking Tourists to Space within 18 Months*, CNN (Oct. 5, 2017, 7:32 PM), <http://cnmmon.ie/2gfDemy>.

3. *Helium-3 Mining on the Lunar Surface*, EUR. SPACE AGENCY, http://www.esa.int/Our_Activities/Preparing_for_the_Future/Space_for_Earth/Energy/Helium-3_mining_on_the_lunar_surface (last visited Nov. 10, 2018).

4. 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 [hereinafter Outer Space Treaty].

5. Joanne Irene Gabrynowicz, *Space Law: Its Cold War Origins and Challenges in the Era of Globalization*, 37 SUFFOLK U. L. REV. 1041, 1043 (2004).

6. See *infra* text accompanying note 113.

7. Kyle A. Jacobsen, *From Interstate to Interstellar Commerce: Incorporating the Private Sector into International Aerospace Law*, 87 TEMP. L. REV. 159, 169 (2014). Environmental implications are also compelling when arriving at a preferred outcome. Such considerations are, however, beyond the scope of this paper. For more on this, see, for example, William R. Kramer, *In Dreams Begin Responsibilities – Environmental Impact Assessment and Outer Space Development*, 19 ENVTL. PRAC. 128 (2017), <https://www.tandfonline.com/doi/abs/10.1080/14660466.2017.1338874>.

8. Katie Rogers, *Trump Orders Establishment of Space Force as Sixth Military Branch*, N.Y. TIMES (June 18, 2018), <https://nyti.ms/2JZCZJg>.

between efficiency and equity. Part I begins with a brief introduction to the Outer Space Treaty and to the concept of customary international law as it relates to outer space, and it then argues that customary international law originally treated the non-appropriation principle of the Outer Space Treaty as unambiguous and broadly applicable to all space activity. Part II examines a shift in State behavior that has carved out an exception to the non-appropriation principle, now arguably recognized in customary international law, that permits the appropriation of extracted space resources.⁹ Part III suggests that a second major shift in the interpretation of the principle, this time to allow private appropriation of space in situ, will soon be similarly underway. Finally, Part IV argues that economic pressures may make this second shift inevitable and that it would be in the best interests of the international community to preempt this change. A carefully framed legal order should be established, potentially through an international leasing system modeled on the United Nations Convention on the Law of the Sea (UNCLOS),¹⁰ to preserve the original goals and purposes of the Outer Space Treaty during this second shift.

I. ORIGINAL INTERPRETATION OF THE NON-APPROPRIATION PRINCIPLE UNDER CUSTOMARY INTERNATIONAL LAW

This Part begins with a brief introduction to the Outer Space Treaty and customary international law as it applies in space. It then turns to a legal history analysis of the original meaning ascribed to the non-appropriation principle of the Outer Space Treaty, concluding that the principle was originally construed quite broadly under customary international law to prohibit nearly all forms of appropriation of space materials, including not only celestial bodies but also extractable space resources.

A. *An Introduction to the Outer Space Treaty*

Even defining “space” is itself a legally fraught exercise—where does the Earth’s atmosphere end and space begin? Various legal theories have been advanced to demarcate this limit.¹¹ There is no universally accepted boundary, but the Kármán line, at an altitude of one hundred kilometers (sixty-two miles) above sea level, is the most widely recognized.¹²

In total, there are five United Nations (U.N.) treaties at the heart of

9. The main space resources in question here are mined metals, such as platinum, palladium, and gold, to be brought back to Earth, as well as hydrogen and oxygen stores to stock rocket refueling stations in space. Erik Simonsen, *Precious Metal Hunters Look to Outer Space*, CNBC (Nov. 21, 2013, 10:26 AM), <https://cnb.cx/2xAiFdd>.

10. United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].

11. The principle theories are the aerodynamic-lift theory, the atmospheric space theory, the *usque ad infinitum* theory, and the lowest-altitude-of-satellite-orbit theory. John A. Vosburgh, *Where Does Outer Space Begin?*, 56 A.B.A. J. 134, 134 (1970).

12. *A Brief History of Space*, INST. PHYSICS, <http://www.iop.org/resources/topic/archive/space> (last visited Nov. 10, 2018). At this altitude, an airplane would have to travel at a speed greater than orbital velocity in order to stay in the air. *Id.*

international space law. These are the 1967 Outer Space Treaty,¹³ the 1968 Rescue and Return Agreement,¹⁴ the 1972 Liability Convention,¹⁵ the 1975 Registration Convention,¹⁶ and the 1979 Moon Agreement.¹⁷ Of these, by far the most important and comprehensive is the Outer Space Treaty. Referred to as the “constitution of space,” the Outer Space Treaty is the primary document that establishes fundamental rules about States’ activities in space.¹⁸ All the major space powers are party to this treaty, including the United States, as are many non-space-going nations. In total, the treaty has been ratified by 107 States.¹⁹

For a consideration of property rights in outer space, the most significant provisions of the Treaty are Articles I and II. Because of their importance to the discussion of resource appropriation in space, they are quoted here in their entirety:

Article I

The exploration and use of outer space, including the moon and other celestial bodies, shall be *carried out for the benefit and in the interests of all countries*, irrespective of their degree of economic or scientific development, and shall be the *province of all mankind*.

Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be *free access to all areas of celestial bodies*.

There shall be freedom of scientific investigation in outer space, including the moon and other celestial bodies, and States shall facilitate and encourage international cooperation in such investigation.

Article II

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.²⁰

The phrase “not subject to national appropriation” in Article II is commonly referred to as the non-appropriation principle. It is the most important

13. Outer Space Treaty, *supra* note 4.

14. 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.

15. Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187.

16. Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15.

17. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 5, 1979, 1363 U.N.T.S. 3 [hereinafter Moon Agreement].

18. Jill Stuart, *The Outer Space Treaty Has Been Remarkably Successful—But Is It Fit for the Modern Age?*, CONVERSATION (Jan. 27, 2017, 11:59 AM), <https://theconversation.com/the-outer-space-treaty-has-been-remarkably-successful-but-is-it-fit-for-the-modern-age-71381>.

19. U.N. OFFICE FOR DISARMAMENT AFFAIRS, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, http://disarmament.un.org/treaties/t/outer_space (last visited Nov. 10, 2018).

20. Outer Space Treaty, *supra* note 4 (emphasis added).

phrase in the Treaty for the purposes of this Note, as will become apparent throughout the ensuing discussion.

B. An Introduction to Customary International Law in Space

Before delving into an examination of what customary international law relating to outer space used to be and indications of how it has changed, it is first helpful to briefly define customary international law. Broadly speaking, the United Nations has acknowledged that “[t]o determine the existence of a rule of customary international law and its content, it is necessary to ascertain whether there is a general practice accepted as law.”²¹ These two elements—(1) a general and consistent State practice that is (2) widely accepted as law (*opinio juris*)—constitute the basis for determining whether customary international law exists.²² This two-element approach is widely supported by State practice²³ and has been accepted for the purposes of establishing evidence of customary international law in international tribunals.²⁴ For instance, in the International Court of Justice’s (ICJ) decision in *Nicaragua v. United States*, the Court concluded that to determine whether a particular rule is entrenched as customary international law, “the conduct of the States should, in general, be consistent with such rule, and that instances of State conduct inconsistent with a given rule should generally have been treated as breaches of that rule, not as indications of the recognition of a new rule.”²⁵

Often, in establishing the existence of customary international law, scholars and legal practitioners rely on a long history of State practice as a key component in demonstrating that the practice is general and consistent.²⁶ Given the very recent development of space law, this condition clearly cannot apply to a discussion of customary international law of space. However, the lack of a long

21. Michael Wood (Special Rapporteur on the Identification of Customary International Law), *Second Report on Identification of Customary International Law*, U.N. Doc. A/CN.4/672 (May 22, 2014).

22. Restatement (Third) of Foreign Relations Law of the United States § 102 (Am. Law Inst. 1987); Vladlen S. Vereshchetin & Gennady M. Danilenko, *Custom as a Source of International Law of Outer Space*, 13 J. SPACE L. 22, 30 (1985) (“Custom as a source of international law, leads to the recognition of the legality of the existing practice if there is general consent, expressed in one form or another, to the observable rule of conduct on the part of the members of the international community.”).

23. See Treaty Concerning the Encouragement and Reciprocal Protection of Investment, U.S.-Uru., Annex A, Nov. 4, 2005, S. TREATY DOC. No. 109-9 (2006) (confirming the parties’ “shared understanding that ‘customary international law’ . . . results from a general and consistent practice of States that they follow from a sense of legal obligation”); Treaty Concerning the Encouragement and Reciprocal Protection of Investment, Rwanda-U.S., Annex A, Feb. 19, 2008, S. TREATY DOC. No. 110-23 (2008) (confirming the same definition of customary international law as the U.S.-Uruguay Treaty); Council Notice, Updated European Union Guidelines on Promoting Compliance with International Humanitarian Law, 2009 O.J. (C 303) 6, 12.

24. See Statute of the International Court of Justice art. 38, June 26, 1945, 59 Stat. 1055, 33 U.N.T.S. 933.

25. Military and Paramilitary Activities in and Against Nicaragua (*Nicar. v. U.S.*), Judgment, 1986 I.C.J. 14, 98, ¶ 186 (June 27).

26. See, e.g., Manley O. Hudson, *Article 24 of the Statute of the International Law Commission*, [1950] 2 Y.B. INT’L L. COMM’N 24, 25, U.N. DOC. A/CN.4/16; Fredric L. Kirgis, Jr., *Custom on a Sliding Scale*, 81 AM. J. INT’L L. 146, 146 (1987); Jack L. Goldsmith and Eric A. Posner, *A Theory of Customary International Law*, 66 U. CHI. L. REV. 1113, 1116 (1999) (defining Customary International Law as “the collection of international behavioral regularities that nations over time come to view as binding as a matter of law”).

history does not necessarily preclude the existence of customary international law. The ICJ has suggested that “the passage of only a short period of time is not necessarily, or of itself, a bar to the formation of a new rule of customary international law.”²⁷ Despite the novelty of the field, customary State action already plays a key role in maintaining the international legal order of outer space.²⁸

Instead of relying on the length of time that States have treated a particular rule as customary international law, other potential sources of evidence that can support a claim of a customary international law include treaties, decisions of national courts and international tribunals, national legislation, diplomatic correspondence, opinions of national legal advisors, and the practice of international organizations.²⁹ Because there is no long history to draw from in establishing the existence of customary international law in space, these other non-time-sensitive methods of establishing customary international law must replace a prolonged history of State practice.

The United Nation’s acknowledged two-part understanding of customary international law is referenced throughout the Note. With this basic definition and its specific application to space in mind, we now move to an examination of customary international law as it relates to the non-appropriation principle.

C. *The Original Meaning Ascribed to the Non-Appropriation Principle*

When the Outer Space Treaty was originally drafted, Article II’s non-appropriation clause was generally not considered ambiguous either in terms of which actors or what parts of outer space were encompassed therein. The Cold War sensibility that spurred the establishment of the Treaty and the realities of space exploration at the time, along with concrete written evidence in the Treaty’s *travaux préparatoires* and the contemporaneous works of legal scholars, combine to support the conclusion that the non-appropriation principle was originally construed broadly under customary international law.

The Cold War origins of the Outer Space Treaty indicate a broad understanding of the non-appropriation principle.³⁰ Countries in the 1960s feared the outcome if the two major space powers of the time, the United States and the Union of Soviet Socialist Republics (USSR), were to gain legal rights to appropriate space or celestial bodies from which they would be able to launch

27. *N. Sea Cont. Shelf Cases*, 1969 I.C.J. 3, 43, ¶ 74 (Feb. 20); see also Michael P. Scharf, *Accelerated Formation of Customary International Law*, 20 ILSA J. INT’L & COMP. L. 305, 306 (2014), https://scholarlycommons.law.case.edu/cgi/viewcontent.cgi?article=2166&context=faculty_publications (arguing that fundamental change “can serve as an accelerating agent, enabling customary international law to form much more rapidly and with less State practice than is normally thought to be possible”). In this light, the realm of space law is an ideal case for quick formation of custom.

28. See Vereshchetin & Danilenko, *supra* note 24 (“[I]n the modern international law of outer space, custom serves as a source of the creation and as a form of the existence of a number of rules governing the relations of states.”).

29. Int’l Law Comm’n, Rep. of the Int’l Law Comm’n to the General Assembly (Part II), *Ways and Means of Making the Evidence of Customary International Law More Readily Available*, 1950 Y.B. INT’L L. COMM’N 367-72, U.N. Doc. A/1316.

30. See Gabrynowicz, *supra* note 5, at 1043.

nuclear weapons.³¹ There were also incentives to keep space free and open to allow for the collection of intelligence via satellite.³² The Outer Space Treaty was therefore drafted and ratified in large part to prevent *any* appropriation—a goal that would have been seriously undermined had the signatories at the time not understood the Treaty to apply broadly.

Technological limitations at the time of the Treaty’s drafting are also relevant when considering the likely original scope attributed to the non-appropriation principle. Private individuals and corporations were not mentioned in the Treaty, likely not because they were purposefully excluded, but rather because the drafters at the time had no reason to imagine a need to extend the application of the Treaty to such parties.³³ The Treaty was drafted under the assumption that States would be the only actors in space.³⁴ Indeed, given the technological capabilities at the time, launching a human being into space required the full support of an entire nation—it would have been very near impossible for a private company to marshal the necessary resources to accomplish something similar on its own.

This interpretation is supported in the Treaty’s *travaux préparatoires*. In a letter to the Chairman of the Committee on the Peaceful Uses of Outer Space dated June 16, 1966, Arthur Goldberg, the Permanent Representative of the United States, summarized the key points for inclusion in the eventual Outer Space Treaty. Specifically, he included as point two in his letter that “[c]elestial bodies should not be subject to *any* claim of sovereignty.”³⁵ Later in the letter, when proposing draft language for the treaty itself, Goldberg incorporated this key point into a proposed treaty provision that read: “Celestial bodies are free for exploration and use by all States”³⁶ The very broad “any claim of sovereignty” point was satisfied, in Goldberg’s view, by referring to States in the language of the Treaty. Had he thought that entities other than States might become involved with the exploration and use of outer space, the draft language he proposed likely would have been broader to conform to the underlying key point he described as foundational to the Treaty.

Other elements of the Outer Space Treaty’s negotiating history also point to an implicit prohibition of private appropriation.³⁷ Individual States’ reactions to the non-appropriation principle are particularly relevant. For instance, on

31. *See id.*

32. THOMAS GANGALE, *THE DEVELOPMENT OF OUTER SPACE: SOVEREIGNTY AND PROPERTY RIGHTS IN INTERNATIONAL SPACE LAW* 11 (2009).

33. For an example of a proposed outline for the Treaty that only contemplated State actors, see Letter from Arthur Goldberg, Permanent Representative of the U.S., to the Chairman of the Comm. on the Peaceful Uses of Outer Space (June 16, 1966), http://www.unoosa.org/pdf/limited/c2/AC105_C2_L012E.pdf [hereinafter Letter from Arthur Goldberg].

34. *See, e.g.,* Virgiliu Pop, *Appropriation in Outer Space: The Relationship Between Land and Ownership and Sovereignty on the Celestial Bodies*, 16 *SPACE POL’Y* 275, 276 (2000) (noting how the treaty neglected to mention individuals or corporations); Fabio Tronchetti, *The Non-Appropriation Principle Under Attack: Using Article II of the Outer Space Treaty in Its Defence*, 50 *PROC. L. OUTER SPACE* 526, 530 (2007) (describing the role of the United States and Soviet Union in the Treaty’s genesis and their focus on balance of State power).

35. Letter from Arthur Goldberg, *supra* note 33 (emphasis added).

36. *Id.*

37. Pop, *supra* note 34, at 276.

August 4, 1966, the head of the Belgium delegation stated that his country “had taken note of the interpretation of the term ‘non-appropriation’ advanced by several delegations—apparently without contradiction—as covering both the establishment of sovereignty and the creation of titles to property in private law.”

³⁸ The French delegate voiced a similar opinion, mentioning that “there was reason to be satisfied that [the] basic principle [was] affirmed, namely: the prohibition of any claim of sovereignty or property rights in space”³⁹

There are indications that even before the Outer Space Treaty was drafted, customary international law prohibited appropriation of outer space.⁴⁰ Most notably, two U.N. General Assembly Resolutions that formed the basis of the text of Article II, one adopted in 1961⁴¹ and the other in 1962,⁴² were accepted unanimously. This unanimity presents evidence of an *opinio juris* among the U.N. members that space and its resources were not subject to appropriation even prior to the adoption of the Outer Space Treaty in 1967.⁴³ Thus, Article II merely formalized in writing what was already customary international law in practice.⁴⁴ Although Article II officially confirmed that outer space could not be appropriated, this understanding predated the ratification of the Treaty.⁴⁵

As yet another indication of the legal consensus of the time, C. Wilfred Jenks, writing two years before the Treaty’s adoption, noted that the only means by which any part of space might be appropriated would be through the United Nations acting on behalf of the world community as a whole.⁴⁶ States acting on their own, and certainly individuals, had no right to appropriate any part of space.

Even as late as 1979, there was still an implicit understanding that the non-appropriation principle applied broadly to all celestial resources, at least for commercial purposes. Writing about the Moon Agreement, which purported to apply many of the principles of the Outer Space Treaty specifically to the moon, F.G. von der Dunk noted an understanding of the delegates that “any substantial—especially *commercial*—exploitative activities required the consent of the community of States.”⁴⁷

Stephen Gorove was one of the few legal scholars of the late 1960s who, rather prophetically, noted that the non-appropriation principle was not as unambiguous as its drafters may have assumed. He understood the drafting of Article II of the Outer Space Treaty as founded on several assumptions: that only States would seek to appropriate space resources; and that the phrase “the moon and other celestial bodies” would be interpreted as the entire celestial body,

38. *Id.* (internal citation omitted).

39. *Id.*

40. Tronchetti, *supra* note 34, at 530.

41. G.A. Res. 1721 (XVI), at 6 (Dec. 20, 1961); Tronchetti, *supra* note 34, at 530.

42. G.A. Res. 1802 (XVII), at 5 (Dec. 14, 1962); Tronchetti, *supra* note 34, at 530.

43. Tronchetti, *supra* note 34, at 530.

44. *Id.* at 527.

45. *Id.*

46. C. WILFRED JENKS, *SPACE LAW* 201 (1965).

47. F.G. von der Dunk, *The Moon Agreement and the Prospect of Commercial Exploitation of Lunar Resources*, 32 *ANNALS AIR & SPACE L.* 91, 98 (2007) (emphasis added).

including extracted resources such as mined minerals.⁴⁸ Gorove highlighted the potential loopholes in the Treaty that these assumptions created, which would allow the non-appropriation principle to be twisted into something quite different from what its authors originally intended:

[T]he Treaty in its present form appears to contain no prohibition regarding individual appropriation or acquisition by a private association or an international organization, even if other than the United Nations. Thus, at present, an individual acting on his own behalf or on behalf of another individual or a private association or an international organization could lawfully appropriate any part of outer space, including the moon and other celestial bodies.⁴⁹

But, again, this view was unusual at the time. Even among academics, the concept of private companies or individuals at the forefront of the space frontier was not widely explored.

Some modern legal theorists have argued that the drafters of the Outer Space Treaty did in fact intend to purposefully exclude individuals and private corporations in their articulation of the non-appropriation principle.⁵⁰ Most often, these arguments rely on the fact that the 1979 Moon Agreement uses language that specifically references individuals in discussing the principle of non-appropriation—language that is lacking in the Outer Space Treaty.⁵¹ However, this reasoning is flawed. The Moon Agreement was drafted a full twelve years after the Outer Space Treaty. The broader language of the Moon Agreement can therefore not be said to indicate that the Outer Space Treaty intentionally created a loophole for private individuals; in terms of the development of human space capabilities, 1967 and 1979 were incredibly different eras and the human imagination of what was possible in space had greatly expanded in the meantime.⁵² It is also noteworthy that this “loophole” argument surfaced in the 1980s, which is later than would be anticipated had this been in the delegates’ minds during the drafting of the Outer Space Treaty in 1967.

II. THE FIRST SHIFT IN CUSTOMARY INTERNATIONAL LAW’S INTERPRETATION OF THE NON-APPROPRIATION PRINCIPLE

Since the drafting of the Outer Space Treaty, several States have chosen to reinterpret the non-appropriation principle as narrower in scope than its drafters

48. Stephen Gorove, *Interpreting Article II of the Outer Space Treaty*, 37 FORDHAM L. REV. 349, 349 (1969).

49. *Id.* at 351.

50. See, e.g., Alan Wasser & Douglas Jobs, *Space Settlements, Property Rights, and International Law: Could a Lunar Settlement Claim the Lunar Real Estate It Needs to Survive?*, 73 J. AIR L. & COM. 37 (2008); Wayne N. White, *Proposal for a Multilateral Treaty Regarding Jurisdiction and Real Property Rights in Outer Space*, SPACE FUTURE (2001), http://www.spacefuture.com/archive/proposal_for_a_multilateral_treaty_regarding_jurisdiction_and_real_property_rights_in_outer_space.shtml.

51. Moon Agreement, *supra* note 17, art. 11, para. 3; see discussion *infra*, Section II.A.

52. Ossiana Tepfenhart, *History of Private Spaceflight Companies*, FUTURISM (2017), <https://futurism.media/history-of-private-spaceflight-companies> (suggesting that private spaceflight companies emerged in the late 1970s and early 1980s as a response to witnessing NASA’s success in the realm of space).

originally intended. This reinterpretation has gone largely unchallenged and has in fact been widely adopted by space-faring nations. In turn, this has had the effect of changing customary international law relating to the non-appropriation principle. Shifting away from its original blanket application in 1967, States have carved out an exception to the non-appropriation principle, allowing appropriation of extracted space resources.⁵³ This Part examines this shift in the context of the two branches of the United Nation's customary international law standard: State practice and *opinio juris*.

A. State Practice

The earliest hint of a change in customary international law relating to the interpretation of the non-appropriation clause came in 1969, when the United States first sent astronauts to the moon. As part of his historic journey, astronaut Neil Armstrong collected moonrocks that he brought back with him to Earth and promptly handed off to the National Aeronautics and Space Administration (NASA) as U.S. property.⁵⁴ Later, the USSR similarly claimed lunar material as government property, some of which was eventually sold to private citizens.⁵⁵

These first instances of space resource appropriation did not draw much attention, but they presented a distinct shift marking the beginning of a new period in State practice. Having previously been limited by their technological capabilities, States could now establish new practices with respect to celestial bodies. This was the beginning of a pattern of appropriation that slowly unfolded over the next few decades and has since solidified into the general and consistent State practice necessary to establish the existence of customary international law.

Currently, the U.S. government owns 842 pounds of lunar material.⁵⁶ There is little question that NASA and the U.S. government consider this material, as well as other space materials collected by American astronauts, to be government property.⁵⁷ In fact, NASA explicitly endorses U.S. property rights over these moon rocks, stating that “[I]lunar material retrieved from the Moon during the Apollo Program is U.S. government property.”⁵⁸

53. Most legal scholars agree that the Outer Space Treaty is itself an example of customary international law. For instance, Gangale and Dudley-Rowley argue that “the fact that [the Outer Space Treaty] has been ratified by 98 states and signed by 27 others” makes a strong case for its status as customary international law. Thomas Gangale & Marilyn Dudley-Rowley, *To Build Bifrost: Developing Space Property Rights and Infrastructure* 8 (Amer. Inst. Aeronautics & Astronautics, Working Paper, 2005), <http://www.astrosociology.com/Library/PDF/Submissions/To%20Build%20Bifrost.pdf>.

54. *Apollo 11 Mission: Lunar Sample Overview*, LUNAR & PLANETARY INST. OF UNIVS. SPACE RESEARCH ASS'N, https://www.lpi.usra.edu/lunar/missions/apollo/apollo_11/samples (last visited Nov. 10, 2018).

55. Gangale & Dudley-Rowley, *supra* note 53, at 5.

56. MATTHEW J. KLEIMAN, *THE LITTLE BOOK OF SPACE LAW* 157 (2013). As Gangale and Dudley-Rowley put it, “Has there ever been a serious challenge to the US or Soviet/Russian governments over their ownership (or at least their control) of the material they brought back from the Moon? These precedents established a principle of customary law that ‘if you take it, it’s yours.’” Gangale & Dudley-Rowley, *supra* note 53, at 1.

57. KLEIMAN, *supra* note 56, at 156.

58. NASA OFFICE OF INSPECTOR GEN., IG-12-007, *NASA’S MANAGEMENT OF MOON ROCKS AND OTHER ASTROMATERIALS LOANED FOR RESEARCH, EDUCATION, AND PUBLIC DISPLAY* (2011) at v n.8.

The U.S. delegation's reaction to the language of the 1979 Moon Agreement further cemented this interpretation that appropriation of extracted resources is a permissible exception to the non-appropriation clause of Article II. Although the United States is not a party to the Moon Agreement, it did participate in the negotiations.⁵⁹ The Moon Agreement states in relevant part:

Neither the surface nor the subsurface of the moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or nongovernmental organization, national organization or nongovernmental entity or of any natural person.⁶⁰

In response to this language, the U.S. delegation made a statement laying out the American view that the words “in place” imply that private property rights apply to extracted resources⁶¹—a comment that went completely unchallenged. That all States seemed to accept this point, even those bound by the Moon Agreement, is further evidence of a shift in customary international law.⁶²

B. *Opinio Juris: Domestic Legislation*

Domestic law, both in the United States and abroad, provides further evidence of the shift in customary international law surrounding the issue of non-appropriation as it relates to extracted space resources.

Domestic U.S. space law is codified at Section 51 of the U.S. Code and has been regularly modified to expand private actors' rights in space.⁶³ Beginning in 1984, the Commercial Space Launch Act provided that “the United States should encourage private sector launches and associated services.”⁶⁴ The goal of the 1984 Act was to support commercial space launches by private companies and individuals.⁶⁵ It did not, however, specifically discuss commercial exploitation of space. The first such mention of commercial use of space appeared in 2004, with the Commercial Space Launch Amendments Act.⁶⁶ This Act specifically aimed at regulating space tourism but did not explicitly guarantee any private rights in space.⁶⁷

The most significant change in U.S. space law came with the passage of the Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act in 2015. As incorporated into Section 51 of the Code, this Act provides:

A United States citizen engaged in commercial recovery of an asteroid resource or a space resource under this chapter shall be entitled to any asteroid resource or space

59. *International Space Activities, 1979: Hearings Before the Subcomm. on Space Science and Applications of the Comm. on Science and Technology*, 96th Cong. 82 (1979) (Statement of S. Neil Hosenball).

60. Moon Agreement, *supra* note 17, art. 11, para. 3.

61. Gangale & Dudley-Rowley, *supra* note 53, at 5.

62. *Id.*

63. 51 U.S.C. §§ 10101-71302 (2018).

64. Commercial Space Launch Act, Pub. L. No. 98-575, § 2(7), 98 Stat. 3055 (1984).

65. FABIO TRONCHETTI, *FUNDAMENTALS OF SPACE LAW AND POLICY* 29 (2013).

66. Commercial Space Launch Amendments Act of 2004, Pub. L. No. 108-492, 118 Stat. 3974 (2004).

67. TRONCHETTI, *supra* note 65, at 30.

resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained in accordance with applicable law, including the international obligations of the United States.⁶⁸

Whereas the idea that private corporations might go into space may have seemed far-fetched to the drafters of the Outer Space Treaty, the SPACE Act of 2015 was the first instance of a government recognizing such a trend and officially supporting private companies' commercial rights to space resources under law. With the new 2015 amendment to Section 51 in place, U.S. companies can now rest assured that any profits they reap from space mining are firmly legal—at least within U.S. jurisdictions.

Although the United States was the first country to officially reinterpret the non-appropriation principle, other countries are following suit. On July 20, 2017, Luxembourg passed a law entitled *On the Exploration and Utilization of Space Resources* with a vote of fifty-five to two.⁶⁹ The law took effect on August 1, 2017.⁷⁰ Article 1 of the new law states simply that “[s]pace resources can be appropriated,” and Article 3 expressly grants private companies permission to explore and use space resources for commercial purposes.⁷¹ Official commentary on the law establishes that its goal is to provide companies with legal certainty regarding ownership over space materials—a goal that the commentators regard as legal under the Outer Space Treaty despite the non-appropriation principle.⁷²

The next country to enact similar legislation may be the United Arab Emirates (UAE). According to the UAE Space Agency director general, Mohammed Al Ahababi, the UAE is currently in the process of drafting a space law covering both human space exploration and commercial activities such as mining.⁷³ To further this goal, in 2017 the UAE set up the Space Agency Working Group on Space Policy and Law to specify the procedures, mechanisms, and other standards of the space sector, including an appropriate legal framework.⁷⁴

Other major space powers are also considering similar laws in the future, including Japan, China, and Australia.⁷⁵ Senior officials within China's space

68. Commercial Space Launch Competitiveness and Entrepreneurship Act (Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act), Pub. L. No. 114-90, § 51303, 129 Stat. 721 (2015) [hereinafter SPACE Act 2015].

69. Jeff Foust, *Luxembourg Adopts Space Resources Law*, SPACE NEWS (Jul. 17, 2017), <http://spacenews.com/luxembourg-adopts-space-resources-law>.

70. *Id.*

71. Loi du 20 juillet 2017 sur l'exploration et l'utilisation des ressources de l'espace [Law of 20 July 2017 on the Exploration and Utilization of Space Resources], JOURNAL OFFICIEL DU GRAND-DUCHE DE LUXEMBOURG [J.O.] [OFFICIAL GAZETTE OF LUXEMBOURG], Jul. 28, 2017, at A674-1 (establishing that permission to use space resources is contingent upon a written request to the ministers).

72. *Space: The Final Frontier – Luxembourg Provides a Legal Framework for the Commercial Exploitation of Space Resources*, LEGITECH (Aug. 9, 2017), <https://www.legitech.lu/newsroom/actualites/space-the-final-frontier-luxembourg-provides-a-legal-framework-for-the-commercial-exploitation-of-space-resources>.

73. Lucy Barnard, *UAE to Finalise Space Laws Soon*, NATIONAL (Mar. 7, 2016, 4:00 AM), <https://www.thenational.ae/business/uae-to-finalise-space-laws-soon-1.219966>.

74. *Id.*; see also *UAE National Space Programme Launched*, GULF NEWS (Apr. 12, 2017), <http://gulfnws.com/uae/government/uae-national-space-programme-launched-1.2010552>.

75. Rishika Daryanani & Travis Fulton, *Asteroid Mining: Developments in Space Property Rights*, NAT. RES. BLOG (Aug. 24, 2017), <https://www.accenture.com/us-en/blogs/blogs-asteroid-mining->

program have explicitly stated that the country's goal is to explore outer space and to take advantage of outer space resources.⁷⁶ The general international trend clearly points in this direction in anticipation of a potential "space gold rush."⁷⁷

C. *Opinio Juris: Legal Scholarship*

Mirroring the shift in State practice and domestic laws, the legal community has also changed its approach to the interpretation of the non-appropriation principle. Whereas at the time of the ratification of the Outer Space Treaty the majority of legal scholars tended to apply the non-appropriation principle broadly, most legal scholars now view appropriation of extracted materials as permissible.⁷⁸ Brandon Gruner underscores that this new view is historically distinct from prior legal interpretation, noting that modern interpretations of the Outer Space Treaty's non-appropriation principle differ from those of the Treaty's authors.⁷⁹

In contrast to earlier legal theory that denied the possibility of appropriation of any space resources, scholars now widely accept that extracting space resources from celestial bodies is a "use" permitted by the Outer Space Treaty and that extracted materials become the property of the entity that performed the extraction.⁸⁰ Stressing the fact that the Treaty does not explicitly prohibit appropriating resources from outer space, other authors conclude that the use of extracted space resources is permitted, meaning that the new SPACE Act is a plausible interpretation of the Outer Space Treaty.⁸¹

However, scholars have been careful to cabin the extent to which they accept the legality of appropriation. For instance, although Thomas Gangale and Marilyn Dudley-Rowley acknowledge the legality of private appropriation of extracted space resources, they nonetheless emphasize that "[o]wnership of and the right to use extraterrestrial resources is distinct from ownership of real property" and that any such claim to real property is illegal.⁸² Lawrence Cooper is also careful to point out this distinction: "[t]he [Outer Space] Treaties recognize sovereignty over property placed into space, property produced in space, and resources removed from their place in space, but ban sovereignty claims by states; international law extends this ban to individuals."⁸³

Although there remain some scholars who still insist on the illegality of the

developments-space-property-rights.

76. See Brandon C. Gruner, Comment, *A New Hope for International Space Law: Incorporating Nineteenth Century First Possession Principles into the 1967 Space Treaty for the Colonization of Outer Space in the Twenty-First Century*, 35 SETON HALL L. REV. 299, 304 (2004).

77. Barnard, *supra* note 73.

78. See Gangale & Dudley-Rowley, *supra* note 53.

79. Gruner, *supra* note 76, at 306.

80. KLEIMAN, *supra* note 56, at 155-56; see also Richard B. Bilder, *A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options*, 33 FORDHAM INT'L L. J. 243, 285-86 (2010).

81. K.R. Sridhara Murthi & V. Gopalakrishnan, *Trends in Outer Space Activities: Legal and Policy Challenges*, in RECENT DEVELOPMENTS IN SPACE LAW: OPPORTUNITIES AND CHALLENGES 34 (R. V. Rao, V. Gopalakrishnan & Kumar Abhijeet eds., 2017).

82. Gangale & Dudley-Rowley, *supra* note 53, at 6.

83. Lawrence A. Cooper, *Encouraging Space Exploration Through a New Application of Space Property Rights*, 19 SPACE POL'Y 111, 117 (2003).

2015 U.S. law and State appropriation of space resources generally,⁸⁴ their dominance has waned since the 1960s. These scholars are now a minority in the face of general acceptance among the legal community that minerals and other space resources, once extracted, may be legally claimed as property.⁸⁵

Taken together, the elements described above—statements made in the international arena, de facto appropriation of space resources in the form of moon rocks, the adoption of new national policies permitting appropriation of extracted space resources, and the weight of the international legal community’s opinion—indicate a fundamental shift in customary international law. The Outer Space Treaty’s non-appropriation clause has been redefined via customary international law norms from its broad application to now include a carve-out allowing appropriation of space resources once such resources have been extracted.

III. IMPENDING SECOND SHIFT IN CUSTOMARY INTERNATIONAL LAW’S INTERPRETATION OF THE NON-APPROPRIATION PRINCIPLE

In contrast to Part II, which dealt with customary international law relating to property claims over materials that are *extracted* from space, this Part explores customary international law in relation to the idea of appropriation of in situ space property. Section II.A first establishes current customary international law norms that prohibit in situ space property ownership via an examination of State practice and *opinio juris*. Section II.B then suggests that, mirroring the first shift in customary international law norms related to extracted space resources, a nascent second shift in the interpretation of the non-appropriation principle regarding in situ space property ownership is likely on the horizon.

The prospect of high profits from the extraction of space resources will likely incentivize private companies and individuals to pressure States to recognize and protect private in situ property rights—which, as previously discussed, is not expressly prohibited by Article II of the Outer Space Treaty. As increasing government openness to private commercial space activities suggests, States will likely buckle under this pressure and allow private companies or private entities under State control to exercise ownership rights. Unless the international community acts soon to clarify the meaning of the non-appropriation principle of the Outer Space Treaty, it is possible that a second organic shift in customary international law will develop and allow for private

84. See, e.g., Steven Freeland & Ram S. Jakhu, *The Intersection Between Space Law and International Human Rights Law*, in THE ROUTLEDGE HANDBOOK OF SPACE LAW 234 (Ram S. Jakhu & Paul Stephen Dempsey eds., 2017) (arguing that the right to natural wealth and resources “is limited to the natural resources of the Earth and would have limited, if any, application to the natural resources of outer space and celestial bodies”); Tronchetti, *supra* note 34, at 528 (noting the “prohibition of appropriation of outer space and its parts is a rule which is valid for both private and public entit[ies]”); Philip de Man, *The Exploration of Outer Space and Celestial Bodies: A Functional Solution to the Natural Resource Challenge* 13 (Leuven Ctr. for Glob. Governance Studies, Working Paper No. 54, 2010) (“Some authors categorically deny the right of States to appropriate any form of space resources, as the general and encompassing wording of Article II OST does not allow differentiating between outer space, including celestial bodies, and the natural resources thereof.”).

85. See *supra* Section II.C.

ownership of in situ space property in further contravention of the original intent of the Treaty.

A. Current Rejection of Individual Property Rights in Space

Although the internationally recognized scope of the non-appropriation principle has been pared back to allow for the ownership of space resources upon extraction, there is still currently a general acceptance in customary international law that the principle prohibits States, individuals, and private corporations from owning in situ property in space. State practice, domestic legislation, and legal scholarship all tend to support this conclusion.

1. State Practice

Currently, States act in accordance with the original understanding of the non-appropriation treaty insofar as they have not endorsed individuals' claims to in situ property in space (as distinct from endorsement of property rights to resources after extraction).

One anecdote that exemplifies the United States' unwillingness to acknowledge private individuals' in situ property rights in outer space comes from the case *Nemitz v. United States*.⁸⁶ On February 12, 2001, NASA's Near Earth Asteroid Rendezvous Shoemaker became the first spacecraft to land on the surface of an asteroid when it touched down on Eros, a twenty-one-mile long asteroid in the sun's orbit.⁸⁷ On February 16, 2001, NASA received a letter from Gregory Nemitz, in which Nemitz claimed ownership over Eros (effectively asserting in situ property rights over the asteroid) and attempted to charge NASA a twenty dollar "parking/storage fee" for NASA's use of the asteroid.⁸⁸ NASA General Counsel Edward Frankle's eventual response, after a series of back-and-forth exchanges, was to deny that Nemitz had any property rights to the asteroid as a celestial body because to acknowledge otherwise would be in contravention of Article II of the Outer Space Treaty.⁸⁹ The matter was settled in court, with the presiding judge relying on similar reasoning in finding for NASA.⁹⁰

Other challenges to the principle of non-appropriation of in situ space property, most notably in the Bogotá Declaration of 1976, have also been struck down.⁹¹ In the Declaration, eight equatorial nations, including Colombia, Congo,

86. *Nemitz v. United States*, No. CV-N030599-HDM (RAM), 2004 WL 3167042 (D. Nev. Apr. 26, 2004).

87. *Flashback: NEAR on Eros*, NASA (Mar. 23, 2008), https://www.nasa.gov/multimedia/imagegallery/image_feature_265.html. Approximately 250 near-earth asteroids are currently known to exist, of which Eros was the first to be discovered. *Near-Earth Asteroid 433 Eros*, NASA, <https://nssdc.gsfc.nasa.gov/planetary/text/eros.txt> (last visited Nov. 10, 2018).

88. Letter from Gregory Nemitz, Chief Exec. Officer, Orbital Development, to Dan Goldin, Adm'r, NASA (Feb. 16, 2001), <http://www.orbdev.com/010216.html>.

89. Letter from Edward Frankle, Gen. Counsel, NASA, to Gregory Nemitz, Chief Exec. Officer, Orbital Development (Apr. 9, 2001), <http://www.orbdev.com/010409.html>.

90. *Nemitz*, 2004 WL 3167042, at *1-2.

91. Declaration of the First Meeting of Equatorial Countries (Bogotá Declaration), Dec. 3, 1976, http://www.spacelaw.olemiss.edu/library/space/International_Agreements/declarations/1976_bogota_declaration.pdf.

Ecuador, Indonesia, Kenya, Uganda, and Zaire (now the Democratic Republic of the Congo), with Brazil as an observer, claimed sovereignty over in situ space property in the form of geostationary orbits above their territories.⁹² Geostationary orbits, thirty-six thousand kilometers above Earth's equator, are particularly valuable because at this distance a satellite orbits the Earth at a speed equal to the Earth's rotation, allowing that satellite to remain over a fixed point on the Earth's surface.⁹³ However, the Bogotá Declaration's attempted appropriation of geostationary orbits was rejected internationally as inconsistent with Article II of the Outer Space Treaty.⁹⁴

Since the Bogotá Declaration, there have not been any significant challenges to the non-appropriation principle concerning appropriation of in situ space property.⁹⁵ There are also no major persistent State objectors who claim the right of ownership of in situ property.⁹⁶ Although customary international law has come to accept State and individual ownership of *extracted* space resources, current State practice supports the conclusion that appropriation of in situ space property (in the form of entire celestial bodies, as with Eros, or particular swaths of space or orbits, as in the Bogotá Declaration) remains impermissible under the non-appropriation clause of the Outer Space Treaty.

2. *Opinio Juris: Domestic Legislation*

The United States has ensured that its commitment to the non-appropriation principle (other than the exception discussed above concerning extracted resources) is codified in domestic law. Restricting its otherwise expansive language, the SPACE Act of 2015 reads: "It is the sense of Congress that by the enactment of this Act, the United States does not thereby assert sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body."⁹⁷

Other countries have also recognized this limitation to private ownership of space in customary international law. For instance, commentary to the new Luxembourg law emphasizes that

[t]he scope of this law is . . . limited to space resources and does not apply to

92. Haris A. Durrani, *The Bogotá Declaration: A Case Study on Sovereignty, Empire, and the Commons in Outer Space*, COLUM. J. TRANSNAT'L L.: THE BULLETIN (2014), <http://jtl.columbia.edu/the-bogota-declaration-a-case-study-on-sovereignty-empire-and-the-commons-in-outer-space>.

93. Dan St. John, *The Bogotá Declaration and the Curious Case of Geostationary Orbit*, DENVER J. INT'L L. & POL.: THE VIEW FROM ABOVE (Jan. 31, 2013), <http://djilp.org/3494/the-bogota-declaration-and-the-curious-case-of-geostationary-orbit>.

94. Pop, *supra* note 34, at 280 ("The only challenge to the international character of the Outer Space [Treaty]—the movement of some Equatorial States concerning some rights reserved for them in the Geostationary Orbit (the Bogota Declaration)—failed."); Vereshchetin & Danilenko, *supra* note 24, at 32 (noting evidence of customary international law in the overwhelming rejection of the Equatorial States' arguments).

95. Deva Prasad M., *Space Tourism and Space Habitation: Significance of Sustainable Development Concept*, in SPACE LAW: THE EMERGING TRENDS 152 (B. Sandeepa Bhat ed., 2018).

96. *Id.* ("There is no major persistent objection to the non-appropriation principle in international space law. The fact that no major space-faring country has claimed sovereignty in outer space elucidates the widespread acceptance [of the] non-appropriation principle.")

97. U.S. Commercial Space Launch Competitiveness Act, Pub. L. No. 114-90, § 403, 129 Stat. 704 (2015).

asteroids, comets and celestial bodies as such, whose appropriation is prohibited by the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, a.k.a. the 1967 Outer Space Treaty.⁹⁸

In their explicit compliance with international law, other States' outer space laws similarly reject private appropriation of space.⁹⁹

3. *Opinio Juris: Legal Scholarship*

Legal scholars also generally accept that the non-appropriation principle legally extends to private individuals as well as to States.¹⁰⁰ Articulations of this position tend to follow one of three lines of reasoning: (1) Article II implicitly bans individual appropriation; (2) even if Article II does not itself ban individual appropriation, the de facto outcome of the explicit bar in Article II against State appropriation of space will necessarily also preclude meaningful individual ownership; or (3) regardless of the language of Article II, customary international law itself precludes private in situ appropriation of land or property in space. But cracks are emerging even in these three seemingly strong legal arguments.

Several scholars assert that the language of Article II itself implicitly bans individual appropriation. The most straightforward argument in this line of reasoning is that the Treaty precludes *all* sovereignty and ownership in space and over its celestial bodies, regardless of whether “the claim comes from nation-states, natural persons, or juridical persons,” indicating a complete moratorium on in situ property rights in space.¹⁰¹ Other scholars conclude that Article II implicitly bans private appropriation as well as State appropriation because property ownership implies control over access: given that Article I guarantees universal free access to all celestial bodies, private appropriation of any celestial body cannot legally occur.¹⁰²

The second approach to the private appropriation question is perhaps the most common: a recognition that Article II does not explicitly or implicitly ban

98. LEGITECH, *supra* note 72.

99. See, e.g., *Space Activities Act 1998* (Cth) pt 1.3(c) (Austl.) (noting the objects of the act include the implementation of “Australia’s obligations under the UN Space Treaties”); Қазақстан Республикасының Заңы Ғарыш қызметі туралы [Law of the Republic of Kazakhstan on Space Activities], art. 2, Law No. 528-IV of 2012 (Kaz.), *translated in* Selected Examples of National Laws Governing Space Activities: Kazakhstan, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, http://www.unoosa.org/documents/pdf/spacelaw/national/kazakhstan/528-IV_2012-01-06E.pdf (“If an international treaty that [is] ratified by the Republic of Kazakhstan establishes other rules than contained in the present law, then the rules of international treaty are applied.”) (last visited Nov. 11, 2018); Ujugaebal Jinheungbeop [Space Development Promotion Act], Act No. 7538, May 31, 2005 (S. Kor.), *translated in* Selected Examples of National Laws Governing Space Activities: Republic of Korea, UN OFFICE FOR OUTER SPACE AFFAIRS, http://www.unoosa.org/oosa/en/ourwork/spacelaw/national/spacelaw/republic_of_korea/space_development_promotions_actE.html (“The Korean government shall carry out space development in conformity with space treaties concluded with other countries and international organizations, and shall use outer space peacefully.”) (last visited Nov. 11, 2018).

100. See, e.g., B. SANDEEPA BHAT, *Answering the Legal Challenges Posed by Recent Developments in Space Activities*, in *SPACE LAW: THE EMERGING TRENDS*, *supra* note 95, at 11; Pop, *supra* note 34, at 275; Tronchetti, *supra* note 34, at 527.

101. Gruner, *supra* note 76, at 332-33.

102. Pop, *supra* note 34, at 277; see also Gangale & Dudley-Rowley, *supra* note 53.

individual appropriation, but that in the absence of State endorsement of these rights (which itself is prohibited), “individual property” as such has no meaning. This approach is exemplified in Fabio Tronchetti’s work. He explains:

[T]here is a general consensus on the fact that both national appropriation and private property rights are denied under the Outer Space Treaty Private entities are allowed to carry out space activities but, according to Article VI of the Outer Space Treaty, they must be authorized to conduct such activities by the appropriate State of nationality. But if the State is prohibited from engaging in certain conduct, then it lacks the authority to license its nationals or other entities subject to its jurisdiction to engage in that prohibited activity.¹⁰³

Other scholars make similar arguments. Virgiliu Pop, for instance, claims that “[a]ppropriation of land can exist outside the sphere of sovereignty, but its survival is dependent upon endorsement from a sovereign entity.”¹⁰⁴ Because “the Outer Space Treaty prohibits the national appropriation of outer space and celestial bodies,” he argues “a State endorsement would be interpreted as a means of national appropriation, hence it would be unlawful.”¹⁰⁵

Finally, approaching the question from a customary international law perspective, Deva Prasad emphasizes that both State practice and *opinio juris* “clearly support the fact that the non-appropriation principle is a customary international law,” noting “widespread acceptance [of the] non-appropriation principle by the States” as well as the absence of any persistent objectors.¹⁰⁶ Thus, even if Article II does not ban private individuals from owning land in and of itself, customary international law in the aggregate is enough to condemn private appropriation of land in space as illegal.

B. Emerging Theories of In Situ Property Rights in Space

Despite the evidence that customary international law currently proscribes in situ appropriation of space property, I argue that a nascent second shift in the interpretation of the non-appropriation principle, which would allow for such in situ ownership, is likely on the horizon. The possibility of such a shift arises from the sheer magnitude of the economic incentives private corporations will have to urge such a recognition. And, if States seek to establish in situ ownership, they will have at their disposal emerging legal arguments pointing to cracks in the theories that the non-appropriation principle bars private ownership of in situ property. Although not yet the basis for any State action, the increasing momentum of these theories portends a second shift in customary international law to allow for in situ ownership of space property.

103. Tronchetti, *supra* note 34, at 528.

104. Pop, *supra* note 34, at 281.

105. *Id.* A similar argument is sometimes also made that, even if ownership of in situ space property is not explicitly prohibited, the language in Article II prohibits actions necessary for ownership to arise (including bans on discovery, occupation, and effective possession). See Tronchetti, *supra* note 34, at 527. Banning the means of attaining private ownership is, in effect, equivalent to banning private ownership itself. *Id.*

106. Prasad, *supra* note 95, at 152 (“The fact that no major space-faring country has claimed sovereignty in outer space elucidates the widespread acceptance [of the] non-appropriation principle.”).

1. *Economic Incentives Portending a Second Shift in Customary International Law's Interpretation of the Non-Appropriation Principle*

The economic incentives for nations with space-faring capabilities to push for a second shift in customary international law's interpretation of the non-appropriation principle are astronomical. The value of the iron in 16 Psyche alone, an asteroid NASA is planning to explore via spacecraft to be launched in 2023, tops \$10,000 quadrillion.¹⁰⁷ Although NASA is planning the venture for purely scientific purposes,¹⁰⁸ this sort of money creates enormous incentives for private corporations to pressure their governments to secure the international recognition of private property rights.

The current legal regime recognized by States (in which property ownership is recognized for extracted resources only) is likely not enough assurance for commercial enterprises that their investments will be protected. For instance, although the United States has claimed the right to resources once they are extracted from outer space, there would still be significant legal uncertainty as to the rights to outer space mines themselves. Under the current system, China or Russia could legally profit from a U.S.-operated mining facility without having invested any of the initial capital because the Outer Space Treaty prevents the United States from appropriating the land which harbors the mine. There would also be legal questions concerning the establishment of permanent space colonies, a goal several private companies have announced their intention of pursuing.¹⁰⁹ Establishing a system of in situ property ownership is therefore likely to be significantly more appealing than a system that allows only for appropriation of extracted resources.

2. *Legal Theories Supporting the Right to In Situ Private Property in Space*

If States decide to explore this avenue, they will have at their disposal the work of several legal theorists, who rely on appeals to both textual arguments and to the realities of the fragility of space law, to push back against the currently accepted norm that private individuals cannot own land or other property in space. These theorists have been described as a "minority of authors,"¹¹⁰ but their claims may lay the foundation for a second shift in customary law. When technology develops to the point that individual appropriation becomes possible,

107. Michael Buchanan, *NASA Goes Heavy Metal with Visit to Iron-Rich Asteroid*, SHAREAMERICA (Jan. 26, 2017), <https://share.america.gov/nasa-plans-heavy-metal-visit-to-iron-rich-asteroid>.

108. *Id.*

109. See, e.g., Michael J. Coren, *As Silicon Valley Lays Plans to Colonize Mars, Researchers Offer a Blueprint for Governing It*, QUARTZ MEDIA (June 10, 2016), <https://qz.com/702624/as-silicon-valley-lays-plans-to-colonize-mars-researchers-offer-a-blueprint-for-governing-it>; Jason Davis, *SpaceX CEO Elon Musk Updates Mars Colonization Plans*, PLANETARY SOCIETY (Sept. 29, 2017), <http://www.planetary.org/blogs/jason-davis/2017/20170929-spacex-updated-colonization-plans.html>; *Human Settlement on Mars*, MARS ONE, <http://www.mars-one.com> (last visited Nov. 10, 2018).

110. Pop, *supra* note 34, at 276.

international norms may shift for a second time, relying on these theories to exclude private individuals and corporations from the ambit of the non-appropriation principle.

From a textual perspective, proponents of this view often rely on the doctrine of *expressio unius est exclusio alterius*.¹¹¹ This canon of construction dictates that expressly including one thing implies the exclusion of the alternative. Some legal scholars have applied this canon to the Outer Space Treaty to interpret Article II's failure to expressly ban private appropriation as an explicit indication that private appropriation is legal. Among such scholars are Alan Wasser and Douglas Jobes, who argue that "if the framers of the Outer Space Treaty had intended to mean that States may not authorize their citizens to do anything which they themselves cannot do, they would have written such language into the Treaty explicitly."¹¹² Once private individuals or corporations have appropriated space, States would be within their rights to recognize these claims. Thus, for example,

the United States simply could state that it would recognize claims by United States nationals (and perhaps by others as well) who discover valuable deposits of minerals or other wealth Recognition of these claims (and protection of them, if necessary, from third parties) would not constitute "national appropriation" or the exercise of sovereignty over territory, but rather the exercise of United States jurisdiction over its citizens and of its power to protect them against third parties in international common areas.¹¹³

According to some of these theorists, a narrow interpretation of Article II would legally "allow other entities like private companies and non-governmental organizations to appropriate territory."¹¹⁴

Another textual argument scholars have advanced to support a narrower reading of the non-appropriation principle is that the clause is exceedingly vague, and therefore State parties are free to interpret the principle however each sees fit.¹¹⁵ Instead of waiting years for international consensus and change, the United

111. *Expressio Unius Est Exclusio Alterius*, BLACK'S LAW DICTIONARY (10th ed. 2014) ("A canon of construction holding that to express or include one thing implies the exclusion of the other, or of the alternative").

112. Wasser & Jobes, *supra* note 50, at 56-57; see also Dave Kopel & Glenn Reynolds, *The New Frontier: Preparing the Law for Settling on Mars*, NAT'L REV. ONLINE (June 4, 2002), reprinted at DAVE KOPEL, <http://www.davekopel.com/NRO/2002/The-New-Frontier.htm> (last visited Nov. 11, 2018).

113. Glenn Harlan Reynolds, *International Space Law: Into the Twenty-First Century*, 25 VAND. J. TRANSNAT'L L. 225, 233 (1992). Brandon Gruner echoes this argument:

The first view presupposes that any nation could avoid violating the Treaty's no-sovereignty provision—yet still implement a system of property rights favorable to the State—by simply recognizing extraterrestrial claims by its citizens in international common areas. The State could then exercise jurisdiction over its citizens by using its power to protect its nationals who are performing activities in those global common areas against persons from other States. In essence, a State achieves extraterrestrial sovereignty through its citizens' actions.

Gruner, *supra* note 76, at 332-33.

114. A.F. van Ballegoyen, *Ownership of the Moon and Mars? The Land-Grant Act as Means of Stimulating Human Settlement of Celestial Bodies*, AD ASTRA 35-37 (Jan.-Feb. 2000), http://www.space-settlement-institute.org/Articles/research_library/BallegoyenOwn.pdf.

115. Kurt Anderson Baca, *Property Rights in Outer Space*, 58 J. AIR L. & COM. 1041, 1068 (1993) (arguing that the Outer Space Treaty is vague about property ownership, and "[t]he consequence of this could be to make the treaty non-binding"). For a more in-depth discussion of ambiguity and its role in various facets of international law, see Derek Jinks's review of a workshop co-sponsored by *Just*

States on its own authority could simply “ignore the 1967 Space Treaty’s no-sovereignty provision”¹¹⁶ and instead act in accordance with whatever provisions it deemed internally desirable. Putting a finer gloss on what is essentially the same point, Wasser and Jobes’ view is that the non-appropriation principle has proven itself to be ambiguous, and as such, “each signatory must interpret for itself what its obligations are.”¹¹⁷ They later imply that the United States should do what is best for itself—which may mean allowing private appropriation of in situ space property.¹¹⁸ Furthermore, some of these same scholars have suggested that the development of customary international law may not rest solely State actions and may be developed by non-State actors’ actions as well.¹¹⁹ Given the incentives private companies have to promote the right to property ownership in outer space despite Article II of the Outer Space Treaty, this prospect should be particularly disquieting for those who hope for an equitable distribution of space resources.

Accompanying these textual arguments, some scholars have suggested that such a shift would not be difficult to accomplish given the fragility and malleability of customary international law as it relates to space. As Wasser and Jobes point out, the United States and the Soviet Union were able to establish the basis of the customary international law for private appropriation of extracted resources simply by asserting ownership over moon rocks they brought back from space.¹²⁰ Similarly, as to the establishment of rights to ownership of physical territory in space under customary international law, all that is needed may be “an international private settlement simply landing on and taking possession of a hunk of Lunar land.”¹²¹ Although attempting to appropriate the moon would likely generate an international outcry, it is not clear that the appropriation of a distant asteroid would incite significant protest, even though it could lay the foundation for a shift in customary international law.

Significantly, such a shift may occur in State practice even if the legal arguments to support this change are weaker than the arguments supporting a continuation of the prohibition of private appropriation. Should States buckle to private commercial pressures or independently recognize the economic benefits of domestic companies obtaining private property in celestial territory, States would have a newfound interest in recognizing and protecting in situ rights. The

Security. Derek Jinks, *Understanding the Fog of Law: Enduring Ambiguities in International Security Law*, JUST SECURITY (May 30, 2018), <https://www.justsecurity.org/57097/understanding-fog-law-enduring-ambiguities-international-security-law>; see also Andreas Kulick, *From Problem to Opportunity?: An Analytical Framework for Vagueness and Ambiguity in International Law*, 59 GERMAN Y.B. INT’L L. 257 (2016), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2917451; Anthony D’Amato, *Purposeful Ambiguity as International Legal Strategy: The Two China Problem* (Nw. Pub. L. Research Paper No. 10-63, 2010), <https://scholarlycommons.law.northwestern.edu/cgi/viewcontent.cgi?article=1093&context=facultyworkingpapers>.

116. Ty S. Twibell, *Space Law: Legal Restraints on Commercialization and Development of Outer Space*, 65 UMKC L. REV. 589, 640 (1997).

117. See Wasser & Jobes, *supra* note 50, at 60

118. See *id.* at 60-61.

119. See, e.g., Twibell, *supra* note 116; Wasser & Jobes, *supra* note 50.

120. Wasser & Jobes, *supra* note 50, at 63.

121. *Id.* at 64.

legal justifications for de jure or de facto cooperation in non-recognition would likely become subordinate to economic incentives—spurring the adoption of new legal arguments to support shifting State interests.

IV. THE NEED FOR A NEW LEGAL ORDER

Given these trends, the international community would do well to rethink the Outer Space Treaty—and soon. Without a clearer articulation of what the international community agrees is the meaning and scope of the non-appropriation principle, it is entirely possible that States will use legal arguments like the ones outlined above to reinterpret Article II to serve the commercial interests of their domestic companies. Even in this new era of extraterrestrial enterprise, many of the norms underlying the Outer Space Treaty, such as equitable access and peaceful use, would remain important goals shared by members of the international community. Without an internationally agreed-upon principle to guide State and private practice, however, these norms could become unobtainable and the fundamental spirit of the Treaty would again be violated. As Fabio Tronchetti puts it:

[I]f any subject was allowed to appropriate parts of outer space, the basic aim of the drafters of the Treaty, namely to prevent a colonial competition in outer space and to create the conditions and premises for an exploration and use of outer space carried out for the benefit of all States, would be betrayed.¹²²

But this outcome is not inevitable. Although economic pressures may make this second shift unavoidable, the international community still has the chance to orchestrate the manner in which this change occurs and work to set up a legal order to preserve the original goals and purposes of the Outer Space Treaty. This Part first examines various proposals in the literature for property rights allocation systems then proposes a new leasing system modeled on the U.N. Convention on the Law of the Sea (UNCLOS).

A. Proposals in the Literature for a Space Property Rights Allocation System

In clarifying the Outer Space Treaty and the non-appropriation principle, the international community will have several options. One solution legal theorists have proposed is to simply restate in clear terms that all in situ property rights to land in space are illegal under Article II.¹²³ However, denying all access to property rights across the board is an inadequate solution for several reasons. First, as a practical matter, States (at least the ones with space-faring capabilities) are unlikely to sign off on something so restrictive. Second, although colonizing and appropriating space could result in significant negative outcomes if not undertaken carefully (including currently unknown environmental impacts both on Earth and in space), exploration and exploitation could lead to significant

122. Tronchetti, *supra* note 34, at 528-29.

123. See, e.g., Arindrajit Basu, *Regulatory Mechanism for the Exploitation of Natural Resources in Outer Space and Celestial Bodies*, in *SPACE LAW: THE EMERGING TRENDS*, *supra* note 95, at 57; Tronchetti, *supra* note 34.

benefits, such as advances in medicine and energy technology. It would be better to work to reap these benefits in an organized way rather than to allow the scramble for control of space that will likely result if the international community does not allow an outlet for this ambition. But the exact nature of the appropriate solution is less clear.

Relying on these approaches to the non-appropriation principle, several legal theorists have begun exploring hypothetical systems for allocating space property. Among the more frequently cited options are a property system that assumes the right of first possession;¹²⁴ a system that operates under the right of continued use;¹²⁵ a credit swap system;¹²⁶ and a system that proposes dividing up space into equal portions and allocating each portion to one country.¹²⁷

Many of these proposed systems require, at a minimum, a substantial overhaul of the current Outer Space Treaty and, at the extreme end, involve revoking the Treaty (or at least the portions dealing with equity and non-appropriation) entirely. For instance, Ty Twibell recommends that Article II of the Outer Space Treaty be removed and replaced with language detailing a method for allocating celestial bodies to various entities.¹²⁸ Byron Brittingham goes further, suggesting the international community scrap the Outer Space Treaty entirely and replace it with a new treaty whose primary purpose would be to allocate private property rights in space.¹²⁹ Kurt Anderson Baca argues that property rights in space are indispensable for development of space resources and therefore recommends that the issue of sovereignty be reconsidered in space.¹³⁰ This sentiment is further echoed by Glenn Reynolds, who is a strong proponent of a full-scale property rights regime.¹³¹

One common proposal that is more in line with the fundamental tenets of the Outer Space Treaty is the creation of a credit system. This proposal, however, is riddled with other flaws. In general, the idea of this system is that the United Nations or some other international body would establish a set quantity of

124. See, e.g., Carol R. Buxton, *Property in Outer Space: The Common Heritage of Mankind Principle vs. the "First in Time, First in Right" Rule of Property Law*, 69 J. AIR L. & COM. 689 (2004); Gruner, *supra* note 76, at 306; Taylor R. Dalton, *Developing the Final Frontier: Defining Private Property Rights on Celestial Bodies for the Benefit of All Mankind* 24 (Aug. 16, 2010) (unpublished Graduate Student Paper, Cornell Law School); Wayne N. White, *Real Property Rights in Outer Space*, SPACE FUTURE (1998), http://www.spacefuture.com/archive/real_property_rights_in_outer_space.shtml.

125. See, e.g., Sohini Banerjee, *Extraterrestrial Habitation and Space Law: A Socio-Legal Perspective*, in *SPACE LAW: THE EMERGING TRENDS*, *supra* note 95, at 50; Lynn M. Fountain, Comment, *Creating Momentum in Space: Ending the Paralysis Produced by the "Common Heritage of Mankind" Doctrine*, 35 CONN. L. REV. 1753, 1777 (2003).

126. See, e.g., Basu, *supra* note 123, at 54; Edwin W. Paxson III, Note, *Sharing the Benefits of Outer Space Exploration: Space Law and Economic Development*, 14 MICH. J. INT'L L. 487, 513-14 (1993); Jeremy L. Zell, Note, *Putting a Mine on the Moon: Creating an International Authority to Regulate Mining Rights in Outer Space*, 15 MINN. J. INT'L L. 489, 492 (2006).

127. See, e.g., Cooper, *supra* note 83, at 117; Barbara Ellen Heim, Note, *Exploring the Last Frontiers for Mineral Resources: A Comparison of International Law Regarding the Deep Seabed, Outer Space, and Antarctica*, 23 VAND. J. TRANSNAT'L L. 819, 846 (1990).

128. Twibell, *supra* note 116, at 683.

129. Bryon C. Brittingham, *Does the World Really Need New Space Law?*, 12 OR. REV. INT'L L. 31 (2010).

130. Baca, *supra* note 115, at 1047.

131. Reynolds, *supra* note 113, at 236.

minerals and other resources from outer space that can be brought to Earth in total, and then each country would be allocated a right to a share. Space-faring nations could exploit their shares directly. Those nations that are as of yet unable to exploit space resources themselves could sell their mineral mining rights to nations that are both able to exploit the resources and willing to pay the price of the share. As described by Arindrajit Basu,

[t]he tradable nature of the credits could enable developing nations to benefit from the exploration and use of outer space monetarily even though they do not have the capability to exploit the natural resources. This credit trading system is certainly in sync with the non-appropriation principle as it is not vesting property rights on celestial bodies but merely allocating the rights to appropriate a certain quantity of natural resources over a set time period.¹³²

Although this system may appear more equitable than the Old-World-style “might is right”¹³³ regime based on the rule of first possession, there are significant problems with this proposal. Most pressing among these are how to equitably divide up these shares. If done on a per-capita basis, key nations would likely not agree to the proposal: a per-capita system would allow China and India to accrue much larger shares than the United States, something the United States would probably not tolerate. On the other hand, doing otherwise would not be in keeping with the spirit of the Outer Space Treaty. Also concerning, this system does not specify *where* nations can mine their allocated share of minerals. There is consequently a good deal of room for conflict if two nations decide to mine their allotted minerals from the same asteroid source. As a third concern, this system does not address issues of space use beyond mineral mining. It does not, for instance, adequately deal with the concept of space tourism or, in the long term, address issues such as the development of space colonies.

B. *A New Property Rights Proposal: Leasing Space*

One promising proposal that does not appear to have received much attention in the literature is the concept of leasing space to nations, private individuals, or companies rather than allocating it as permanently-owned property. It appears that the only authors who have even tangentially considered the possibility of leasing property rights in space beyond rights to mineral extraction are Marcel Williams and G.S. Sachdeva. Williams’ writing is limited to a thought experiment in which he imagines renting out up to one percent of the moon’s surface. This property would be directly leased to national governments, which in turn would be vested with the power to sublease sections of this territory to private companies or individuals.¹³⁴ This proposal is not elaborated any further and is left as a broad-strokes outline. The second mention

132. Basu, *supra* note 123, at 74.

133. As described by Professors Oona Hathaway and Scott Shapiro in OONA A. HATHAWAY & SCOTT J. SHAPIRO, *THE INTERNATIONALISTS* 23-24 (2017) (referencing Hugo Grotius, as quoted in 17 *BIBLIOTHECA VISSERIANA: DISSERTATIONUM IUS INTERNATIONALE ILLUSTRANTIUM* 73 (G.N. Clark & Johnkheer W.J.M. Van Eysinga eds., 1951)).

134. Marcel F. Williams, *Leasing the Moon*, *NEW PAPYRUS* (Feb. 3, 2017), <http://newpapyrusmagazine.blogspot.com/2017/02/leasing-moon.html>.

of leasing or renting space comes from G.S. Sachdeva, who argues that a U.N. Space Superintendence Authority could grant leases to those able to pay.¹³⁵ Yet this theory is limited to a discussion of renting property rights in particular orbits to allow for hovering geostationary space hotels and does not delve into questions of renting land on celestial bodies.

The concept of leasing outer space deserves greater consideration by space law scholars. This Section sketches a brief outline of how such a system might operate via an internationally-run space property rental system modeled on UNCLOS. Although UNCLOS itself is deeply problematic in its potentially devastating environmental consequences and negative impacts on indigenous peoples as it regulates deep-sea mining,¹³⁶ the UNCLOS model may nonetheless be the best option for preserving non-space-faring nations' rights with regard to outer space, given its success in providing developing nations with a voice in the regulation of the high seas and the seabed beyond national jurisdiction.¹³⁷ It is worth noting that although very few scholars appear to have considered the possibility of renting space, several have examined the similarities between UNCLOS and space law.¹³⁸ The approach advanced here differs from the conventional approach to this comparison in that it suggests that the international community move beyond merely authorizing nations or individuals to extract a certain quantity of minerals and instead consider the possibility of leasing out actual tracts of space land.

Opened for signature on December 10, 1982, UNCLOS establishes the international rules that govern the use of the world's oceans and their resources. An examination of UNCLOS is especially apt because it deals with resources—the high seas—that, like space, are not subject to national appropriation. In language strikingly similar to Article II of the Outer Space Treaty, Article 137 of UNCLOS reads:

135. G.S. Sachdeva, *Space Tourism—Some Legal Implications*, in *SPACE LAW: THE EMERGING TRENDS*, *supra* note 95, at 95, 114.

136. See, e.g., BLUE OCEAN LAW & PACIFIC NETWORK ON GLOBALIZATION, RESOURCE ROULETTE: HOW DEEP SEA MINING AND INADEQUATE REGULATORY FRAMEWORKS IMPERIL THE PACIFIC AND ITS PEOPLES (2016), <https://cer.org.za/wp-content/uploads/2016/08/Resource-Roulette-Deep-sea-Mining-and-Inadequate-Regulatory-Frameworks.pdf>. A more complete analysis of both environmental and human impacts of such a proposal as it relates to outer space would be needed before actually moving forward in practice.

137. For instance, Papua New Guinea will reap economic benefits approaching eighty million dollars as a result of seabed mining off its coast. *PNG Could See US \$80m Benefits from Seabed Mining*, RNZ (Mar. 7, 2016, 6:02 AM), [https://www.radionz.co.nz/international/programmes/datetimepacific/audio/201791963/png-could-see-us\\$80m-benefits-from-seabed-mining](https://www.radionz.co.nz/international/programmes/datetimepacific/audio/201791963/png-could-see-us$80m-benefits-from-seabed-mining); see also Maurice Hope-Thompson, *The Third World and the Law of the Sea: The Attitude of the Group of 77 Toward the Continental Shelf*, 1 B.C. THIRD WORLD L.J. 37, 37-38 (1980) (“[I]t is certain that some of the major provisions of the [UNCLOS] convention will reflect the articulated ‘position’ of the Third World countries that the resources of the ocean space should be shared equitably, with preference being given to the needs of the developing countries.”); Alan O. Sykes & Eric A. Posner, *Economic Foundations of the Law of the Sea 20* (Univ. of Chi. John M. Olin Program in Law & Econ. Working Paper No. 504, 2009), https://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=1186&context=law_and_economics (noting that UNCLOS “provides for redistribution of wealth (including intellectual property) to developing nations—as compared to a baseline where states (or their mining companies) kept whatever they exploited”).

138. See, e.g., Brittingham, *supra* note 129; Heim, *supra* note 127; Gangale & Dudley-Rowley, *supra* note 53, at 5.

No State shall claim or exercise sovereignty or sovereign rights over any part of the Area [resources of the seabed and ocean floor beyond the limits of national jurisdiction] or its resources, nor shall any State or natural or juridical person appropriate any part thereof.¹³⁹

Although there are clear similarities between the two treaties, there are substantial differences as well, many of which would be useful in informing an update to the Outer Space Treaty. In addition to extending the prohibition on sovereignty to individuals as well as to nations, UNCLOS goes far beyond the Outer Space Treaty in detailing the limits of the non-appropriation principle. All of Part XI of UNCLOS, totaling fifty-eight Articles, gives a detailed description of how States can negotiate within the bounds of the non-appropriation principle to exploit ocean resources. Of particular relevance for purposes of crafting a parallel space law proposal is UNCLOS Part XI, Section 4, which lays out the rules governing the International Seabed Authority—the main mechanism through which States and private companies can legally exploit ocean resources, including mining of the deep seabed.¹⁴⁰

Using UNCLOS as a model, a similar system may prove promising for the evolution of space law. However, the new space system should allow for rental of space land instead of merely allowing for the extraction of space resources. As with UNCLOS, any such space leasing system should be run through the United Nations. Situating such a system in this forum would help the international community stay true to the intentions of the Outer Space Treaty, which provides, in the words of one author, a “philosophical roadmap for the future development of the outer space legal regime.”¹⁴¹ Although a new committee within the United Nations could be formed for this purpose, the existing Committee on the Peaceful Uses of Outer Space (UNCOPUOS) would be an ideal environment for the creation and operation of such a system. UNCOPUOS is composed of eighty-seven geographically and economically diverse member States (including all the major space-faring States). Additionally, intergovernmental organizations and non-governmental organizations have observer status.¹⁴² Given its central mission to maintain space as a peaceful arena of international cooperation, as well as its representative composition,¹⁴³ it would be an ideal body to bring a space leasing system to fruition.

UNCOPUOS, in turn, should operationalize the leasing system by establishing a new International Outer Space Authority. This Outer Space Authority should parallel the International Seabed Authority described above.¹⁴⁴ There should be similar provisions for the International Outer Space Authority

139. UNCLOS, *supra* note 10, art. 137.

140. *See id.* pt. XI.

141. Jefferson H. Weaver, *Illusion or Reality? State Sovereignty in Outer Space*, 10 B.U. INT’L L.J. 203, 227 (1992).

142. *Members of the Committee on the Peaceful Uses of Outer Space*, U.N. OFFICE FOR OUTER SPACE AFFAIRS, <http://www.unoosa.org/oosa/en/members/index.html> (last visited Nov. 10, 2018).

143. *Roles and Responsibilities*, U.N. OFFICE FOR OUTER SPACE AFFAIRS, <http://www.unoosa.org/oosa/en/aboutus/roles-responsibilities.html> (last visited Nov. 10, 2018).

144. *See supra* note 140.

relating to the makeup and functioning of the Authority (with each country getting one vote and decisions made by a two-thirds majority);¹⁴⁵ the power of the Outer Space Authority to exercise control over space generally;¹⁴⁶ the ability to decide how much rent to charge nations or individual corporations;¹⁴⁷ and how to use these funds,¹⁴⁸ among other provisions.

For this proposed Outer Space Authority to be useful as well as operational, it is critical that it have jurisdiction over property rights in space beyond mining rights. Having rights to property in addition to rights to extracted minerals would add an extra layer of legal security for companies considering venturing into space for mining purposes. And, although businesses currently seem most interested in the possibilities of mining space resources, in the long term, questions of space tourism and the potential development of space colonies may arise. Having a flexible system in place that can adequately handle these concerns is therefore desirable. Instead of just focusing on mining, an Outer Space Authority with broader jurisdiction will have longer staying power and will require less reworking in the near future.

Part of the appeal of this rental model is that it works so seamlessly with the current Outer Space Treaty. Turning again to the language of the Treaty and beginning with the non-appropriation principle, Article II lays out that “[o]uter 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.”¹⁴⁹ Because no State or individual would ever own land in space under a leasing system, this proposed leasing regime would not be in contravention to Article II. And yet, despite this, a leasing regime would establish enough legal security that exploitation of space resources would not be impeded—the main rationale for those who argue that the Treaty (or at least Article II) should be rescinded.

Moreover, the principle established in Article I of the Outer Space Treaty, that “[t]he exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind,” is also upheld under this leasing regime.¹⁵⁰ Leasing not only allows nations and private companies to exploit space resources and reap the benefits of their labor, but also directly benefits developing countries not yet able to tap into the resources of space by redistributing some of the space-going nations’ profits via a leasing fee and a tax on extracted resources.

145. *Cf. supra* note 10, art. 159.

146. *Cf. id.* art. 162(2)(1).

147. *Cf. id.* art. 164(2)(b). Annex III of UNCLOS also establishes how much extracting parties would have to pay—either a production charge only, or a combination of production charge and share of net proceeds (as a percentage). *Id.* annex III.

148. *Cf. id.* art. 160(2)(g). The powers of the Authority include the ability “to decide upon the equitable sharing of financial and other economic benefits derived from activities in the Area, consistent with this Convention and the rules, regulations and procedures of the Authority.” *Id.* Within this category, the Space Authority should ideally specifically reference the mandate laid out in Article I of the Outer Space Treaty. Outer Space Treaty, *supra* note 4, art. I.

149. *Id.* art. II.

150. *Id.* art. I.

A potential argument against this rental system, as well as any other international legal system that would seek to regulate property rights in space, is that the United States never signed on to UNCLOS and there is nothing different about this situation that would cause the United States to join an international treaty regulating property in space either. However, space law has a fairly different history than the law of the sea. These differences make it more likely (though unfortunately not certain) that a proposal for an International Outer Space Authority would be adopted by the United States despite the fact that the facially similar UNCLOS proposal failed to garner a two-thirds majority vote in the Senate.

The major difference between UNCLOS and this proposed International Outer Space Authority is that the United States has self-interested reasons for supporting an International Outer Space Authority, whereas it did not have similar reasons to join UNCLOS. The United States has maintained that under customary international law, deep seabed mining is already permissible.¹⁵¹ Since the United States does not recognize limitations of deep seabed mining established in UNCLOS, it may legally undertake deep sea mining under customary international law—a right that is codified in domestic U.S. law in the Deep Seabed Hard Mineral Resources Act:

[I]t is the legal opinion of the United States that exploration for and commercial recovery of hard mineral resources of the deep seabed are freedoms of the high seas subject to a duty of reasonable regard to the interests of other states in their exercise of those and other freedoms recognized by general principles of international law . . .

. . .¹⁵²

The United States therefore already has access to what it wants without having to join UNCLOS. As an additional point, there is also not much pressure from American companies to ratify UNCLOS, in part because the American Exclusive Economic Zone (recognized by the United States under customary international law)¹⁵³ and the continental shelf is hugely rich in the resources companies might otherwise have hoped to gain by joining the Treaty and gaining access to minerals from deep sea mining in other areas. Finally, not only does the United States stand to gain very little by ratifying the Treaty, there is an argument that ratification would disadvantage the United States. Under UNCLOS, “coastal States are required to make payments to the International Seabed Authority based on a percentage of revenues derived from the exploitation of the resources found within the continental margin beyond two

151. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 303, pt. V, Introductory Note, at 5 (AM. LAW INST. 1987) (“[B]y express or tacit agreement accompanied by consistent practice, the United States, and states generally, have accepted the substantive provisions of the Convention, other than those addressing deep sea-bed mining, as statements of customary law binding upon them apart from the Convention.”).

152. 30 U.S.C. § 1401(a)(12) (2018); *see also* 30 U.S.C. § 1402 (2018).

153. *See* Bonnie A. McGregor, Terry W. Offield, *The Exclusive Economic Zone: An Exciting New Frontier*, U.S. DEP’T OF INTERIOR 7, <https://pubs.usgs.gov/gip/7000049/report.pdf> (last visited Nov. 11, 2018); *see also* Steven Groves, *Background: The U.S. Can Mine the Deep Seabed Without Joining the U.N. Convention on the Law of the Sea*, HERITAGE FOUND. (Dec. 4, 2012), <http://thf-media.s3.amazonaws.com/2012/pdf/bg2746.pdf>.

hundred miles from the coast.”¹⁵⁴ Notably, customary international law creates no such obligation.¹⁵⁵

In stark contrast to UNCLOS, the new rental system proposed would directly benefit the United States. Unlike with deep sea mining, the United States and its citizens currently are bound by a treaty that prohibits appropriation of space: the Outer Space Treaty. Unlike the UNCLOS analogy, the United States has already relinquished rights in this arena. Agreeing to a leasing amendment would expand the scope of its rights, not infringe upon them. Additionally, the United States does not have access to an outer space “exclusive economic zone” in the same way that it does for the sea. Without some sort of agreement, the United States simply may not legally appropriate any in situ property in outer space.

One final consideration increases the likelihood that the United States would in fact become a signatory to an amendment to the Outer Space Treaty. Such an amendment would likely have the support of businesses, environmental groups, and the military, an unlikely combination of key constituencies that would help push an amended treaty forward. Businesses would advocate for the change because it would provide a clearer mechanism for establishing property rights.¹⁵⁶ Environmental groups might push for the amendment’s ratification because of the environmental protections that could be included in such an agreement.¹⁵⁷ Finally, the military would also likely be a proponent of the system because having access to property in space gives strategic advantages¹⁵⁸ and

154. James L. Malone, *The United States and the Law of the Sea After UNCLOS III*, 46 L. & CONTEMP. PROBS. 29, 34 (1983).

155. *Id.*; see also Robert C. “Rock” De Tolve, *At What Cost? America’s UNCLOS Allergy in the Time of “Lawfare”*, LXI NAVAL L. REV. 1, 7 (2012) (pointing out that the United States only considers “UNCLOS’ navigational provisions to be predominantly reflective of customary international law,” thereby implying that other UNCLOS provisions, including those that require payments to the ISA, are not accepted as customary) (emphasis added).

156. See Jeff Foust, *Cruz Interested in Updating Outer Space Treaty to Support Commercial Space Activities*, SPACE NEWS (Apr. 26, 2017), <http://spacenews.com/cruz-interested-in-updating-outer-space-treaty-to-support-commercial-space-activities>.

157. See Gordon Chung, *Emergence of Environmental Protection Clauses in Outer Space Treaty: A Lesson from the Rio Principles*, in *A FRESH VIEW ON THE OUTER SPACE TREATY 1* (Annette Froehlich ed., 2018).

158. See, e.g., Yasuhito Fukushima, *Debates Over the Military Value of Outer Space in the Past, Present and the Future: Drawing on Space Power Theory in the U.S.*, NIDS J. DEF. & SECURITY 14 (Dec. 2013). Of course, this can also be seen as a negative—giving the military a platform for space-to-earth strikes is not necessarily a desirable outcome. During World War I, many Pacific islands were once acquired as coaling stations to facilitate projections of force into Asia. See, e.g., Warwick Brown, *When Dreams Confront Reality: Replenishment at Sea in the Era of Coal*, INT’L J. NAVAL HIST. (Dec. 1, 2010), <http://www.ijnhonline.org/2010/12/01/when-dreams-confront-reality-replenishment-at-sea-in-the-era-of-coal> (“[S]o firm was the British Empire’s grip over the world’s steam coal and coaling facilities that it was an important economic weapon in itself during the First World War. Indeed the Royal Navy was unique in its ability to project its power across the globe without recourse to logistical support from others.”); Felicity Caird, *The Strategic Significance of the Pacific islands in New Zealand’s Defence Policy, 1935-1939*, at 14 (1987) (unpublished Master’s thesis, University of Canterbury), https://protorp.org/wp-content/uploads/2017/05/Thesis_Strategic-significance-of-PICs.pdf (noting that “Samoa and Fiji were especially coveted (sic)” for strategic reasons). Similarly, asteroids and other celestial bodies may one day function as refueling stations to further enhance military power. Clara Moskowitz, *“Wet” Asteroid Could Be a Space Gas Station*, SPACE (May 4, 2010, 4:46 PM) <https://www.space.com/8339-wet-asteroid-space-gas-station.html>; Debbie Siegelbaum, *The Companies Vying to Turn Asteroids into Filling Stations*, BBC NEWS (Sept. 26, 2014), <https://www.bbc.com>

because it is likely that certain Cold War-era concerns that prompted space-faring nations to sign the original Outer Space Treaty remain relevant—most notably, concerns over the weaponization of space.¹⁵⁹

CONCLUSION

The brief history of outer space law since the adoption of the Outer Space Treaty in 1967 highlights the ease with which customary international law shifts in this arena. Despite an original broad interpretation of the non-appropriation principle during the Treaty's drafting, customary international law has since carved out an exception to this principle for extracted space resources. A second shift could be similarly underway. Driven by economic incentives, States may reinterpret the non-appropriation principle to allow for private appropriation of space property.

Currently, States have an incentive to cooperate to establish a new international agreement concerning the use of outer space because international law, as it is presently understood, prohibits private property rights in space. A new amendment could broaden these rights, providing an enticing carrot to encourage State cooperation. But this enticement may soon disappear. Given the flexibility of the current outer space legal regime, customary international law could easily shift to interpret the non-appropriation principle as allowing private appropriation of property in space. Whatever the international community decides is the optimal solution regarding outer space property rights, it is vital that action be taken now to preserve the principles advanced by the Outer Space Treaty, such as equitable access and peaceful use of outer space. As the original drafters of the Outer Space Treaty recognized, these principles are best protected through a formal agreement and not merely through customary international law, which is often driven by the most powerful States. Regardless of whether a rental system similar to the one described above is established or some other method is used, the international community will have to act quickly if it wants to maintain shared international control over space. Pursuing an amendment to the Treaty as described also provides certainty and timeliness, two elements that would likely appeal to constituencies that might otherwise be supposed to be content with waiting for customary international law to shift.

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159. To the extent that this Note suggests that a shift toward *in situ* appropriation is on the horizon, there may arise a counter-argument to this Section that various constituencies, particularly the business community, have little to gain from such a proposal. If I am right that such a shift is imminent, companies may eventually be rewarded with actual property rights, not merely leasing rights, once customary international law has adequately shifted. However, relying on this eventual occurrence requires significant risk tolerance: the precise outcomes of this shift are still fairly nebulous. It is also not certain to take place in the immediate future. As a result, the business community may find that pursuing an amendment to the Treaty is a preferable option.