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FINDERS KEEPERS: WHO HAS SAY OVER PRIVATE PROPERTY IN SPACE

Jose A. Martin del Campo[†]

Abstract

Current space law is unclear as to whether private entities may claim possession of resources extracted from their endeavors in outer space. The lack of certainty prevents private entities from entirely investing in infrastructure and capabilities to access new deposits of resources due to the depletion of minerals and resources on Earth. The establishment of a new space regime devoid of non-appropriation principles found in international law is necessary to motivate private entities to invest the capital in extracting and transporting space resources back to Earth.

This Comment seeks to understand how the current framework of space law impacts the property rights of private entities and their claim to resources in space. The 1967 Outer Space Treaty prohibited the claiming of property by sovereign nations. However, the concept of private entities now having the capability to extract resources from outer space has reignited the issue of property rights in outer space. With resources becoming scarcer or priced out of the market, the solution of mining these resources from celestial bodies has caused a new space race. Past multilateral agreements have dealt with similar discoveries such as the polymetallic nodules on the ocean floor; however, these agreements led to disputes as to ownership and the rights to extract said resources. With little to no support from the industrialized nations, the structure of any new regime must ensure access for the benefit of humankind. The benefit of allowing these

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private entities the right to claim mined resources must be weighed against potential drawbacks in order to create a framework that balances the interest of the free market with that of the common heritage principle. In determining that a suitable framework fails to guide a new space regime, this Comment proposes that a new governing body comprising a rotation of space-faring and non-spacefaring nations act as a regulatory body for the interest of all of humankind.

I. INTRODUCTION

On October 4, 1957, the Space Age officially began when the Soviet Union launched Sputnik into orbit, the first successful, human-

made satellite.[1] A little more than a decade later, on July 20, 1969, American astronauts Neil Armstrong and Edwin "Buzz" Aldrin became the first humans to land and step foot on the moon.[2] Neil Armstrong marked the completion of John F. Kenney's national goal of landing an astronaut on the moon when he radioed back to Earth "[t]hat's one small step for man, one giant leap for mankind."[3] The launch of Sputnik, the moon landing, and other endeavors achieved by the scientific community, kick-started a chain of events leading to the current ambition of exploring outer space and mining resources throughout the solar system.

The push for unlocking low-cost space travel and space industrialization by entrepreneurs, like Elon Musk and Jeff Bezos, propels the search for extraterrestrial materials such as water and minerals.[4] According to NASA, minerals found in the asteroid belt between Mars and Jupiter contain an estimated value of approximately $100 billion for every person on Earth.[5] However, uncertainty lingers because private entities are unsure that they will possess property rights to their payload or the mined celestial body.[6] Celestial bodies refer to naturally occurring objects in space. The United States Commercial Space Transportation Advisory Committee ("COMSTAC"), an advisory body to the Federal Aviation Administration's ("FAA") Office of Commercial Space Transportation ("FAA-AST"), has undertaken review regarding the

1. Alan Boyle, *Sputnik Started Space Race, Anxiety*, NBC NEWS (Oct. 4, 1997), http://www.nbcnews.com/id/3077890/ns/technology_and_science-space/t/sputnik-started-space-race-anxiety/#.XaSEzHdFxl4 [https://perma.cc/36KV-3SKP].

2. History.com Editors, *1969 Moon Landing*, HISTORY (July 21, 2019), https://www.history.com/topics/space-exploration/moon-landing-1969 [https://perma.cc/LM3K-E6ED].

3. *Id.*

4. Thomas Heath, *Space-Mining May be Only a Decade Away. Really.*, WASHINGTON POST (April 28, 2017), https://www.washingtonpost.com/business/space-mining-may-be-only-a-decade-away-really/2017/04/28/df33b31a-29ee-11e7-a616-d7c8a68c1a66_story.html [https://perma.cc/7JXE-YZG9].

5. Andrew Wong, *Space Mining Could Become a Real Thing — And it Could be Worth Trillions,* CNBC (May 15, 2018), https://www.cnbc.com/2018/05/15/mining-asteroids-could-be-worth-trillions-of-dollars.html [https://perma.cc/RP7J-E9JR].

6. Leonard David, *Mining the Moon? Space Property Rights Still Unclear, Experts Say*, SPACE (July 25, 2014), https://www.space.com/26644-moon-asteroids-resources-space-law.html [https://perma.cc/J69Q-JK3Y].

granting of private property licenses.[7] COMSTAC expressed a desire to confirm that private entity resource extractions may be owned and utilized as it deems appropriate.[8]

The current framework of space law is a combination of agreements with the foundation of space law consisting of 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 ("Outer Space Treaty").[9] At the time of signing, the Outer Space Treaty hoped to foster cooperative and peaceful exploration of outer space without discrimination of any kind.[10] However, Article II of the Outer Space Treaty contains the bane of private property rights in outer space, which forbids the national appropriation of the moon and other celestial bodies.[11] While the Outer Space Treaty explicitly mentions the prohibition of public entities claiming celestial bodies, private enterprises risk failing to have their interest in property rights recognized by the global community.

Private entities and investors grapple with the issues pertaining to their rights to mine and extract resources from outer space legally. Without further international recognition of their property rights, private entities may shy away from exploring the concept of celestial mining. The issue of not knowing what laws are applicable, or to whom private companies are accountable, impedes the progress private entities make in achieving their goal of harvesting extraterrestrial resources.

Private entities fear that the non-appropriation clause of Article II of the Outer Space Treaty, the epicenter of the issue, will strip them of the right to transport their mined resources back to Earth. A new legal regime will likely need to be formed that facilitates the continuation of innovation and promotes the exploration of outer space. Whether or not past private and public international doctrines, *i.e.*, the law of the sea, may provide guidance in creating a new doctrine of space law is yet to be determined.

7. *Id.*
8. *Id.*
9. 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].
10. *Id.*
11. *Id.* art. II.

The advancement in modern technology, along with the depletion of natural resources, creates a unique opportunity for private entities to resolve this issue through the exploitation of outer space. Space law is once again relevant due to its inadequacies in protecting the property rights of said entities in space. Part II will explore the different treaties and principles that gave rise to space law, and Part III will analyze whether the application of such principles should continue, or if the establishment of a new regime offers a more beneficial long-term solution. Part IV will then explore the structure of a new outer space regime and the enforcement of property rights.

II. LEGAL PRINCIPLES INFLUENCING THE DEVELOPMENT OF SPACE LAW

As the world continues to transform and evolve, lawmakers across the globe must adapt past laws or develop and ratify new laws to address current events and situations. The venture into outer space is similar to that of famous past explorations in which customary laws guided journeys, providing a framework of starting points for the crafting of the present-age space law. Space law must adapt and evolve as engineers and the science community make discoveries that past generations could only dream about. The United Nations General Assembly ("General Assembly") maintains the view that "International Law" is not spatially restricted, and that its charter is relevant even in the outer reaches of outer space and to celestial bodies.[12] When analogizing to present international treaties, the most applicable set of principles is that of the high seas.[13] Based on the principle of *res communis*, issues arise because there is a lack of precise rules.[14] Since the beginning of the space race in 1957, the United Nations facilitated general agreements on how space exploration should be conducted. However, an understanding of past and current laws is necessary to determine how to proceed in recognizing property rights in space for private entities.

12. IAN BROWNLIE, PRINCIPLES OF PUBLIC INTERNATIONAL LAW 255 (6th ed. 2003).
13. *Id.*
14. *Id.*

A. *History of the Current Space Law Framework*

Space law is the body of law applicable to and involved in governing space-related activities.[15] Space law is "associated with the rules, principles, and standards of international law appearing in the five international treaties and five sets of principles governing outer space," originating under the supervision of the United Nations Organization.[16] The foundation of space law, similar to general international law, is composed of matters such as international agreements, treaties, conventions, rules and regulations of international organizations, General Assembly resolutions, national laws, executive and administrative orders, and judicial decisions.[17]

Following the launch of Sputnik in 1957, the General Assembly created an ad hoc committee concerned with identifying legal issues involving outer space activities.[18] The Committee on the Peaceful Uses of Outer Space ("COPUOS") was established in 1958 and was made permanent on December 12, 1959.[19] COPUOS is intended to endorse peaceful international collaboration and establish the common interest of humankind in outer space.[20] It is the preeminent body regarding the formation of international space law, drafting five international treaties and five sets of principles regarding space-related activities.[21] Topics covered by the treaties include non-appropriation of outer space by any one country, arms control within space, and the freedom of exploration.[22] The primary focus of the treaties being any and all activities performed in outer space be done

15. *Space Law*, UNITED NATIONS OFF. FOR OUTER SPACE AFFS., https://www.unoosa.org/oosa/en/ourwork/spacelaw/index.html [https://perma.cc/2VEG-VYT7].

16. *Id.*

17. *Space Law*, *supra* note 14; *See generally For the Industry & the Private Sector*, UNITED NATIONS OFF. FOR OUTER SPACE AFFS., http://www.unoosa.org/oosa/en/informationfor/faqs.html [https://perma.cc/BFD6-T37F].

18. Elizabeth Howell, *Who Owns the Moon? Space Law & Outer Space Treaties*, SPACE.COM (Oct. 27, 2017), https://www.space.com/33440-space-law.html [https://perma.cc/9KGG-X8AL].

19. *Id.*

20. *Id.*; *See generally* TANJA MASSON-ZWAAN & MAHULENA HOFMAN, INTRODUCTION TO SPACE LAW (4th ed. 2019).

21. *Space Law Treaties and Principles*, UNITED NATIONS OFF. FOR OUTER SPACE AFFS., http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html [https://perma.cc/3LWF-U5YZ] (last visited Oct. 19, 2019).

22. *Id.*

so to enhance the well-being of humankind and the promotion of international cooperation.[23]

In 1966, COPUOS proposed the Outer Space Treaty, which was ratified soon after in 1967.[24] The Outer Space Treaty forms the bedrock for international cooperation in the peaceful exploration of space and the development of new law.[25] The Outer Space Treaty's principles focus on exploration carried out for the benefit and in the interest of all countries (Art. I), preclusion of sovereign states from appropriating celestial bodies in outer space (Art. II), the performance of activities in outer space in accordance with international law (Art. III), and the prohibition of launching any kinds of objects or armaments into orbit that possess nuclear weapons or any other kinds of weapons of mass destruction (Art. IV).[26] Of importance to this Comment is the language of Article II. Article II does not explicitly mention the property rights of private entities; the failure to do so led to a split regarding whether such rights breach the Outer Space Treaty.[27]

COPUOS concluded four more treaties following the ratification of the Outer Space Treaty.[28] The second treaty was the Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space ("Rescue Agreement"), which entered into force in 1968.[29] The Rescue Agreement elaborates on Articles V and VII of the Outer Space Treaty.[30] It provides that nations rescue and assist distressed astronauts, which also includes returning them to their launching

23. *Id.*
24. *Id.*
25. Outer Space Treaty, *supra* note 9.
26. *Id.* at arts. I–IV.
27. *Id.* art. II; Elizabeth Howell, *Who Owns the Moon? Space Law & Outer Space Treaties*, SPACE.COM (Oct. 27, 2017), https://www.space.com/33440-space-law.html [https://perma.cc/9KGG-X8AL].
28. *Space Law Treaties and Principles*, *supra* note 21.
29. *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*, UNITED NATIONS OFF. FOR OUTER SPACE AFFS., https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introrescueagreement.html [https://perma.cc/6QLA-ZCCR] (last visited Feb. 16, 2020); Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968, U.N. GAOR, 22nd Sess., Supp. No. 16, at 5, U.N. Doc. A/6716 (1968), 19 U.S.T. 7570 [hereinafter Rescue Agreement].
30. Rescue Agreement, *supra* note 29.

state.[31] Also, states, upon request, are to provide assistance in recovering space objects that re-enter Earth outside of the territory of its proper owner.[32]

The Convention on International Liability for Damage Caused by Space Objects ("Liability Convention"), the third of the five COPUOS treaties, was under the scrutiny of the Legal Subcommittee of COPUOS for approximately nine years.[33] The General Assembly ultimately reached an agreement in 1971, and the Liability Convention entered into force in 1972.[34] The Liability Convention expounds on Article VII of the Outer Space Treaty providing "that a launching [s]tate shall be absolutely liable to pay compensation for damage caused by its space objects on the surface of the Earth or to aircraft, and liable for damage due to its faults in space."[35] The Liability Convention possesses the procedures regarding claim settlement for damages.[36]

The COPUOS Legal Subcommittee drafted the Convention on Registration of Objects Launched into Outer Space ("Registration Convention"), the fourth treaty, from 1962 until the General Assembly adopted the treaty in 1974.[37] The convention entered into force in September 1976.[38] This treaty builds upon desires in prior treaties to provide a mechanism to assist identifying space objects.[39] The

31. *Id.*
32. *Id.*
33. *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*, UNITED NATIONS OFF. FOR OUTER SPACE AFFS., https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introrescueagreement.html [https://perma.cc/6QLA-ZCCR] (last visited Feb. 16, 2020); Rescue Agreement, *supra* note 29.
34. *Id.*; *See* Convention on International Liability for Damage Caused by Space Objects, *opened for signature* Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Liability Convention].
35. *Id.*
36. *Id.*
37. *Convention on Registration of Objects Launched into Outer Space*, UNITED NATIONS OFF. FOR OUTER SPACE AFFS., https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introregistration-convention.html [https://perma.cc/77Q8-H7SZ] (last visited Feb. 16, 2020).
38. *Id.*; Convention on Registration of Objects Launched Into Outer Space, *opened for signature* Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15, 16, https://treaties.un.org/doc/Publication/UNTS/Volume%201023/volume-1023-I-15020-English.pdf [https://perma.cc/N9X4-NYDT] [hereinafter Registration Convention].
39. *Id.*; *Convention on Registration of Objects Launched into Outer Space*,

Registration Convention made a request for the Secretary-General to maintain the registration and provide open admittance to the information.[40]

The fifth and final treaty by COPUOS was the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies ("Moon Agreement").[41] The General Assembly adopted the agreement in 1979; however, the Moon Agreement lacked widespread ratification, with only five countries signing by July 1984.[42] The overall purpose of the Moon Agreement was to reinforce the principles highlighted in the provisions of the Outer Space Treaty and their application to the Moon and other celestial bodies.[43] The Moon Agreement seeks to encourage peaceful exploration, avoid disruption of celestial environments, and alert the United Nations of the location and purpose of any construction of a station on a celestial body.[44]

In addition, the Moon and its natural resources are identified as belonging to the common heritage of humankind and, should exploitation of these resources become feasible, an international regime should be created to oversee such progress.[45]

Since its inception, the Moon Agreement, containing the resource limitation found within the common heritage principle, garnered little support internationally, particularly within the United States.[46] With only fourteen signatories, none being spacefaring

UNITED NATIONS OFF. FOR OUTER SPACE AFFS., https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introregistration-convention.html [https://perma.cc/77Q8-H7SZ] (last visited Feb. 16, 2020).

40. Registration Convention, *supra* note 38, at art. V.

41. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, *opened for signature* Dec. 18. 1979, 1363 U.N.T.S. 3, https://www.unoosa.org/pdf/gares/ARES_34_68E.pdf [https://perma.cc/AJ3U-HHJ7] [hereinafter Moon Agreement].

42. *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/intromoon-agreement.html [https://perma.cc/V9EW-L4WK] (last visited Feb. 16, 2020); Moon Agreement, *supra* note 41, at art. IX, para.3.

43. *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/intromoon-agreement.html [https://perma.cc/V9EW-L4WK] (last visited Feb. 16, 2020).

44. *See* Moon Agreement, *supra* note 41, at arts. III, VII, IX.

45. *Id.* at art. XI, para. 5.

46. Rand Simberg, *Property Rights in Space*, THE NEW ATLANTIS, https://www.thenewatlantis.com/publications/property-rights-in-space [https://perma.cc/XY2M-U8VG] (last visited Jan. 19, 2020).

nations, the Moon Agreement lacks international recognition as law.[47] However, the provisions of the Moon Agreement may block the full economic potential and development of space.[48] A comprehension of international law aids in understanding the principle of the common heritage of humankind emphasized in the Moon Agreement.

B. *Customary International Law and its Underlying Principles*

International law, also known as public international law or the law of nations, is composed of a multitude of legal rules, norms, and standards overseeing the relationships between different sovereign actors and other internationally recognized entities on the global stage.[49] Over time, international law grew to include individual entities and international organizations—crucial elements of contemporary international law previously omitted from the definition.[50] International law is developing to incorporate not only rules but also non-binding and influential principles, practices, and assertions blended with complicated structures and processes.[51] The breadth of international law has grown from the conventional topics ranging from war, peace, and diplomacy to encompassing "human rights, economic and trade issues, space law, and international organizations."[52] International law should be distinguished from international comity, the courtesies afforded to foreign states, and from the subject of conflict of laws or private international law, which is the determination of municipal law involving foreign elements.[53]

International law operates independently of the system of laws concerning the legal orders of a particular state.[54] There are also no courts of international law that possess complete jurisdiction over sovereign states.[55] Thus, neither an authoritative international body to

47. *Id.*
48. *Id.*
49. Malcolm Shaw, *International Law*, ENCYCLOPEDIA BRITANNICA (Nov. 13, 2019), https://www.britannica.com/topic/international-law [https://perma.cc/9KQ9-3QMS].
50. *Id.*
51. *Id.*
52. *Id.*
53. *Id.*
54. *Id.*
55. *Id.*

enforce a judgment or the law exists, nor is there an overarching executive body with supreme authority.[56]

Public international law is composed of multiple conventions and principles. Within these international principles, the law of the sea (particularly the provisions regarding the deep seabed), the Antarctica Treaty of 1959, and the *res communis* principle all influenced the non-appropriation provision in the series of space treaties.

1. Aboard the High Seas

"The modern law governing the high seas has its foundation in the rule that the high seas are not open to acquisition by occupation on the part of states individually or collectively: it is *res extra commercium*."[57] A brief history demonstrates that the high seas doctrine emerged from two different factors: the increasing dominance of maritime powers and the reduction of influence from states favoring closed seas.[58]

The fifteenth century saw states favoring appropriation of or at least exclusive rights over the seas, and the Papal Bulls of 1493 and 1506 disseminated the oceans around the world to Spain and Portugal.[59] Elizabeth I challenged the Spanish monopoly on the West Indies and later affirmed the freedom of the seas in response to Spain's protest of the English Drake expedition.[60] Later on, English policies in the seventeenth-century reversed course, promoting the principle of closed seas.[61] This time period signified the peak of the *mare clausum* (closed sea) until the eventual fall of the British claim to sovereignty by the late eighteenth century.[62]

During the transitioning of the law of the sea, Dutch jurist Hugo Grotius in 1609, argued in *Mare Liberum* that the high seas should be free for navigation and fishing because natural law forbids ownership of resources created for universal use.[63] Grotius' idea came

56. *Id.*
57. BROWNLIE, *supra* note 11, at 224.
58. *Id.*
59. *Id.*
60. *Id.*
61. *Id.*
62. *Id.*
63. Nina Tannenwald, *Law Versus Power on the High Frontier: The Case for a Rule-Based Regime for Outer Space*, 29 YALE J. INT'L L. 363, 390 (2004).

at a time when the sea was thought to possess "limitless" resources.[64] Grotius stated that the seas were open to all for navigation and fishing because natural law forbids the ownership of things that were created to be shared by all.[65] His perception was that so long as there was no interference, nations were free to exploit resources.[66] Grotius further argued that rights to the sea could not exist in the same manner as rights of land; thus, the sea was "free to all and subject to none."[67] The law of the high seas evolved from a theory of limited access to one of unfettered access by the eighteenth century.[68] The principle of freedom of the seas holds that a state cannot appropriate areas of the sea except for its own vessel when outside its national waters.[69]

The late eighteenth century saw the implementation of the cannon-shot rule, and claims to large areas of the sea ceased to exist.[70] The cannon-shot rule held that a nation's sovereignty extends up to the range of a cannonball.[71] The range was first defined as one marine league or three miles in diplomatic practice.[72]

Naval power and commercial interests in the nineteenth century dictated British, French, and American support for the principle of freedom of the sea and the concept of shared use.[73] In terms of jurisdiction on the high seas, the United Nations Convention on the Law of the Sea of 1982 ("UNCLOS III") upheld the general principle that vessels on the high seas are only subjected to the authority of the state whose flag they fly.[74] With the lack of any territorial sovereignty upon the high seas, no state of any kind can assert jurisdiction over foreign vessels.[75]

The law of the sea provides a foundation for determining the proper regime to install regarding the application of private property rights to celestial bodies. This is particularly important concerning the

64. *Id.*
65. *Id.*
66. *Id.*
67. *Id.*
68. BROWNLIE, *supra* note 11, at 224.
69. Tannenwald, *supra* note 63, at 390.
70. BROWNLIE, *supra* note 11, at 225.
71. *Id.* at 180.
72. *Id.*
73. *Id.* at 225.
74. *Id.* at 238; United Nations Convention on the Law of the Sea, art. 90, *opened for signature* Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].
75. BROWNLIE, *supra* note 11, at 238.

seabed and ocean floor, which is beyond the jurisdiction of states. In applying the pre-existing seabed regime of the high seas, the seabed could not be, in principle, appropriated by a sovereign state.[76] Historic title and prescription played a role in protecting interests such as sedentary fisheries.[77]

Concerns such as overfishing and pollution pushed the international community to begin codifying ocean law.[78] The first convention ("UNCLOS I") took place in 1958 and resulted in four non-binding conventions.[79] The results from UNCLOS I "largely asserted the traditional law of the sea, codified traditional practices of the great powers, and left large gaps which 'continued to widen during the subsequent decades.'"[80] Issues that remained unsettled included defining limits to territorial seas, establishing jurisdictions involving fisheries, and imposing limits on the continental shelf.[81] These unresolved issues, as well as others from the first convention, ultimately led to a third reconvening in 1974.[82]

2. The Regime of the Seabed and the Ocean Floor: Common Heritage Designation

In the 1960s, prior regimes did not cover the viability of collecting resources from the ocean floor.[83] Proposals addressing the issue suggested either portioning the ocean floor between coastal states or granting a mining operation to individual entities.[84] Immense deposits of polymetallic nodules containing manganese, nickel, copper, and cobalt caused this new development in the law of the sea.[85]

Dr. Arvid Pardo, Malta's United Nations representative, proposed that the seabed and its resources, beyond the limit of national jurisdiction, should be held as part of the "common heritage of

76. *Id.* at 241.
77. *Id.*
78. Tannenwald, *supra* note 63, at 393.
79. *Id.*
80. *Id.*
81. *Id.*
82. *Id.* at 394.
83. BROWNLIE, *supra* note 11, at 241–42.
84. *Id.* at 242.
85. *Id.*

mankind."[86] Briefly, the common heritage of mankind (common heritage principle) represents that:

> "certain global commons or elements regarded as beneficial to humanity as a whole should not be unilaterally exploited by individual states or their nationals, nor by corporations or other entities, but rather should be exploited by under some sort of international arrangement or regime for the benefit of mankind as a whole."[87]

The proposal became part of UNCLOS III, resulting in comprehensive internationalization of the deep seabed mineral resources.[88] The addition of the common heritage principle, also found in the Moon Agreement, prohibited the ability of sovereign entities to claim rights over any part of the area—defined as "the sea-bed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction"—or its resources. The principle also suggests that the International Sea-Bed Authority should organize and control all activities exclusively.[89]

Developed western nations, who have not signed the UNCLOS III agreement, oppose such a change and opine that the ordinary regime of the freedom of the seas should apply to the resources located in the deep seabed.[90] Thus, the United States and other developed nations, including France, Germany, and the United Kingdom, propagated legislation to permit and regulate mining of the seabed resources, forming a "Reciprocating States Regime" that offered mutual recognition of deep-sea mining activities.[91]

3. Antarctica Treaty of 1959

In addition to the law of the sea, international law encompasses other legal treaties that have influenced space treaties. The space law regime created by the ratification of the 1967 Outer Space Treaty is partly analogous to that of the Antarctica Treaty of 1959.[92] The intent

86. *Id.*
87. Edwin Egede, *Common Heritage of Mankind*, OXFORD BIBLIOGRAPHIES, (May 12, 2017), https://www.oxfordbibliographies.com/view/document/obo-9780199796953/obo-9780199796953-0109.xml [https://perma.cc/SWM4-T55D].
88. BROWNLIE, *supra* note 11, at 242.
89. *Id.*; *see also* UNCLOS, *supra* note 73, arts. 133, 136, 156, 157.
90. BROWNLIE, *supra* note 11, at 244.
91. *Id.* at 244–45.
92. *Id.* at 256.

behind the Antarctic Treaty is to promote only peaceful intentions and the freedom to perform scientific research and cooperation towards that goal.[93] The treaty allows the presence of military units, only for peaceful purposes, and prohibits nuclear explosions.[94] A provision within the treaty states that:

> [n]o acts or activities taking place while the Treaty is in force shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica. No new claim, or enlargement of an existing claim, to territorial sovereignty in Antarctica shall be asserted while the present Treaty is in force.[95]

The quoted provision is not solely limited to contracted parties according to the text, and the Treaty as a whole leads to the questioning of non-signatories' obligations.[96]

The issue of exploiting minerals has also appeared in the Antarctica Treaty.[97] Developments against the eventuality of discovering methods to extract minerals have provoked opposition.[98] One contention is that of establishing a regime for the exploitation of minerals below the ice sheets, while others want to focus on conservation.[99]

4. *Res Communis* in Outer Space

The *res communis* (defined as a common thing) and *res nullius* (defined as something without a master) maxims are two legal concepts that heavily influenced the laws of the high seas, the polar regions of Antarctica, and outer space.[100] The development of space law raised the question of the legal status of outer space and whether or not celestial resources fell under the maxim of *res communis* or *res nullius*.[101]

93. *Id.* at 254.
94. *Id.*
95. *Id.*
96. *Id.*
97. *Id.* at 255.
98. *Id.*
99. *Id.*
100. Louis de Guoyon Matignon, *The Res Communis Concept in Space Law*, SPACE LEGAL ISSUES (Feb. 28, 2019), https://www.spacelegalissues.com/space-law-the-res-communis-concept-in-space-law/ [https://perma.cc/GS5K-8EBU].
101. *Id.*

With the Outer Space Treaty's commencement in 1967, the *res communis* doctrine dominated conversations regarding the international law on exploiting outer space and its resources by sovereign entities and individuals; this doctrine states that outer space is property to all of humankind and is not limited to solely one entity.[102] The Outer Space Treaty's Article I goes as far as cementing the doctrine of *res communis omnium* (a thing of the entire community) by holding that the exploitation and exploration of outer space is a "province of all mankind."[103] The Outer Space Treaty maintains that outer space is an extra-jurisdictional territory, prohibiting states from exercising their sovereign rights.[104]

The application of the common heritage principle in the 1967 Outer Space Treaty has proved divisive and polarizing ever since its emergence.[105] Its philosophical nature forces radical departures from what may be the norm because it questions the management of globally valuable resources; applying the common heritage principle requires a reexamination of traditional principles and doctrines concerning international law.[106] Such classical principles include: "acquisition of territory, consent based sources of international law, sovereignty, equality, resource allocation, and international personality."[107] The underlying premise of *res communis* may effectively limit expansion and innovation in outer space in two particular areas: national security and property rights and commercialization.[108]

C. *Current National Legislations*

Article VI of the Outer Space Treaty calls for proper supervision by the appropriate State Party for non-governmental activities in space.[109] In anticipation of the race to space, national legislatures adopted their own interpretation regarding the authority of space mining and the procedures for obtaining licenses. The United

102. *Id.*
103. *Id.*
104. *Id.*
105. *Id.*
106. *Id.*
107. *Id.*
108. *Id.*
109. MASSON-ZWAAN & HOFMAN, *supra* note 20, at 101.

States and Luxemburg took their own proactive approach to address the exploitation of space resources.

1. The 2015 U.S. Commercial Space Launch Competitiveness Act

President Barack Obama signed the U.S. Commercial Space Launch Competitiveness Act ("Space Act") into law with the intention to foster and promote a pro-growth environment for the development of a commercial space agency through private investments and the stabilizing of regulatory conditions.[110] In doing so, the United States became the first country to adopt a national regulatory framework concerning space resources.[111] Title IV of the Space Act recognizes the property rights of United States citizens who engage in celestial commercial mining; this further encourages the commercial exploration and utilization of celestial resources.[112] The Space Act defines space resource as an "abiotic resource *in situ* in outer space."[113]

Three conditions must be satisfied to receive protection from the statute.[114] First, the actor engaged in space activities must be classified as a United States citizen pursuant to Title 51 of the U.S. Code.[115] United States citizens are natural persons of United States citizenship or legal entities subject to the jurisdiction of the United States.[116] Second, United States authorities must provide the citizen authorization for space activities.[117] The United States utilizes "an 'enhanced' version of the Federal Aviation Administration's payload review process to issue mission authorizations" because, at the time of adoption, there was no government agency competent or qualified to

110. U.S. Commercial Space Launch Competitiveness Act, Pub. L. No. 114-90, 129 Stat. 704 (2015) (Preamble to the Space Act of 2015).
111. MASSON-ZWAAN & HOFMAN, *supra* note 20, at 102.
112. *President Obama Signs Bill Recognizing Asteroid Resource Property Rights into Law*, PLANETARY RESOURCES (Nov. 25, 2015), https://www.planetaryresources.com/2015/11/president-obama-signs-bill-recognizing-asteroid-resource-property-rights-into-law/ [https://perma.cc/PR37-7D7D].
113. U.S. Commercial Space Launch Competitiveness Act, Pub. L. No. 114-90, § 51301(2)(A), 129 Stat. 704, 721 (2015) (Preamble to the Space Act of 2015); MASSON-ZWAAN & HOFMAN, *supra* note 20, at 102.
114. MASSON-ZWAAN & HOFMAN, *supra* note 20, at 102.
115. *Id.*
116. *Id.*
117. *Id.*

authorize space activities.[118] Third, the Space Act contains a Disclaimer of Extraterrestrial Sovereignty, stating that the United States does not assert sovereignty over any celestial body.[119]

2. The Entry of Luxemburg into Space Law

On July 13, 2017, Luxemburg became the first European country to have a legal framework that recognized property rights in space for the utilization and extraction of materials in accordance with international law.[120] Luxemburg utilized the United States' own space property law as a model when developing the "Law on the Exploration and Use of Space Resources of Luxemburg."[121] This law marks a stepping stone in the Grand-Duchy of Luxemburg's plan to transform the nation into the global center for space mining.[122] Following the signing of the new law, the Luxemburg government established the Spaceresources.Lu initiative to support the space resources industry.[123]

D. *Legal Framework of the International Space Station*

The International Space Station Intergovernmental Agreement ("IGA"), signed on January 29, 1998, is an international treaty consisting of fifteen space-faring nations who are part of the Space Station Project.[124] Three international cooperation agreements make up the Space Station's legal framework.[125] The IGA bound its members to a long-term cooperative agreement based on "genuine partnership, for the detailed design, development, operation, and

118. *Id.*
119. *Id.* at 103.
120. *Space Mining Law Passes In Luxembourg*, PLANETARY RESOURCES (July 13, 2017), https://www.planetaryresources.com/2017/07/space-mining-law-passes-in-luxembourg/ [https://perma.cc/YT4V-2T9E].
121. MASSON-ZWAAN & HOFMAN, *supra* note 20, at 103.
122. *Space Mining Law Passes In Luxembourg*, PLANETARY RESOURCES (July 13, 2017), https://www.planetaryresources.com/2017/07/space-mining-law-passes-in-luxembourg/ [https://perma.cc/YT4V-2T9E].
123. *Id.*
124. *International Space Station Legal Framework*, EUROPEAN SPACE AGENCY, http://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/International_Space_Station/International_Space_Station_legal_framework [https://perma.cc/F9TQ-RUDX] (last visited Nov. 17, 2019).
125. *Id.*

utilization of a permanently inhabited civil Space Station for peaceful purposes, in accordance with international law (Article I)."[126]

Following the IGA were the four Memoranda of Understandings ("MoUs") "between the National Aeronautics and Space Administration ("NASA") and the following cooperating Space Agencies: European Space Agency ("ESA"), Canadian Space Agency ("CSA"), Russian Federal Space Agency ("Roscosmos"), and Japan Aerospace Exploration Agency ("JAXA")."[127] The objective intent of the MoUs is to delineate the responsibilities and duties involving the design, operation, and utilization of the Space Station.[128] The MoUs also define the management structure and interfaces necessary to ensure effective utilization.[129] Lastly, several mutual Implementing Agreements dictate the procedure for implementing the MoUs, distributing guidelines and tasks amongst the signatories.[130]

Regarding jurisdiction, the IGA signatories may extend national jurisdiction to elements of the station, which they have agreed to prove, and over their nationals who are in or around the Space Station.[131] Therefore, the owners of the specific elements aboard the Space Station are legally responsible for said elements; European members are recognized as a solitary entity identified as the European Partners, but each individual European country "may extend their respective national laws and regulation to the European elements, equipment, and personnel."[132] The MoUs recognize a partner's jurisdiction and national law application in numerous matters.[133] Therefore, conflicts of jurisdiction aboard the space station are resolved "through the application of other rules and procedures already developed nationally and internationally."[134]

III. LEGAL ANALYSIS OF SPACE LAW

Space law has come a long way since its inception following the launch of Sputnik in 1957. With the progression in science and an

126. *Id.*
127. *Id.*
128. *Id.*
129. *Id.*
130. *Id.*
131. *Id.*
132. *Id.*
133. *Id.*
134. *Id.*

impending shortage of raw materials, the current installation of treaties needs to change to address growing concerns related to space exploration and development. History provides a pool of resources and precedents for addressing the legal issues that arise in space.

The collection of space treaties may be interpreted as limiting sovereign entities from staking claims to celestial resources and leaving private citizens and enterprises free to extract such resources from outer space.[135] Article II of the Outer Space Treaty explicitly forbids any appropriation by means of use or occupation.[136] The foundation of space law was formulated at a time when the Iron Curtain was drawn across Europe; national governments dominated space activities, and commercial space enterprises were in their infancy.[137] The effort to find a compromise between existing legal frameworks and international agreements, regarding the private property rights of private entities in space, requires a resolution to identify the most appropriate authority to govern private interest in space.

Regulations based on customary laws make up the current framework of space law.[138] The analysis in the next Section will dive into the argument of whether customary international law provides a sufficient perspective regarding the private property rights of non-sovereign states or if a new legal framework must be forged.

A. Does Celestial Mining Violate the Space Treaties?

The emergence of projects to capture and transport resources from space back to Earth sparked discussions within COPUOS regarding two main points: (1) are space resource collection projects compatible with the Article II principle of prohibiting ownership rights within the 1967 Outer Space Treaty; and (2) do such projects

135. William Herkewitz, *The Biggest Barrier to Asteroid Mining Isn't Technical, It's Legal*, POPULAR MECHANICS (Aug. 16, 2016), https://www.popularmechanics.com/space/deep-space/a22347/asteroid-mining-international-law/ [https://perma.cc/BW4R-9T4Z].

136. Sebastian Gibson, *Space Law: Guide to Development of Space Resources on Asteroids and the Moon*, HG.ORG, https://www.hg.org/legal-articles/space-law-guide-to-development-of-space-resources-on-asteroids-and-the-moon-52077 [https://perma.cc/95MG-8SRP] (last visited Jan. 19, 2020).

137. *Space Law*, ENCYCLOPEDIA BRITANNICA (Apr. 4, 2019), https://www.britannica.com/topic/space-law [https://perma.cc/84QB-HZAL].

138. *Id.*

conflict with the common heritage principle?[139] The Moon Agreement's language denouncing appropriation has resulted in different interpretations.

1. Non-Appropriation of Space Resources

Article II of the Outer Space Treaty states that "outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of occupation, or by any other means."[140] Those who oppose commercial resource extraction view the Article II provision as broadly precluding all forms of resource appropriation—whether by a sovereign nation or private enterprise—of materials extracted from a celestial body.[141] The opposition supports its argument with the provisions within Article XI paragraph 1 of the Moon Agreement, holding that the common heritage principle applies to all naturally occurring resources located in outer space.[142] The proscription of both private and public property rights is again announced in Article XI paragraph 3 of the Moon Agreement.[143]

However, a narrow interpretation of Article I of the Outer Space Treaty counters the opposition's argument by guaranteeing the freedom to explore and the use of outer space, including the moon and other celestial bodies.[144] Such an interpretation of space mining "is considered to be neither an 'appropriation' of space parts of outer space nor of resources *in situ*."[145] Instead, the space mining activities' purpose could be understood as a "use" without any demand for

139. Outer Space Treaty, *supra* note 9, at art. II.
140. MASSON-ZWAAN & HOFMAN, *supra* note 20, at 99.
141. *Id.*
142. *Id.*
143. Moon Agreement, *supra* note 41, at art. XI, para. 3. Article XI, para. 3 states: "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 non-governmental organization, national organization or non-governmental entity or of any natural person. The placement of personnel, space vehicles, equipment, facilities, stations and installations on or below the surface of the moon, including structures connected with its surface or subsurface, shall not create a right of ownership over the surface or the subsurface of the moon or any areas thereof. The foregoing provisions are without prejudice to the international regime referred to in paragraph 5 of this article."
144. Outer Space Treaty, *supra* note 9, at arts. I, II.
145. MASSON-ZWAAN & HOFMAN, *supra* note 20, at 99.

territorial appropriation of the celestial bodies concerned.[146] An analogy to the legal regime of the high seas pursuant to the UNCLOS III agreement and its incorporation of the common heritage principle that allows for freedom to fish furthers this point of thinking.[147] The failure of the Moon Agreement to garner more international support lends further credence to the debate that the limitations regarding space activities pursuant to the common heritage principle are only binding to the Agreements' signatories and are not held as international customary law.[148] Based on one's interpretation, determining whether the mining of space resources amounts to appropriation depends on a narrow or broad interpretation of the Outer Space and Moon Treaties. Here, it is likely that—like fishing in the sea—collecting resources would likely not violate the Outer Space Treaty.

2. The Application of the Province of Mankind to Space Resources

Where did the province of mankind come to affect space resources? Article I of the Outer Space Treaty states that "the exploration and use of outer space, including the moon and other celestial bodies, shall be 'the province of all mankind.'"[149] This principle is located between the language stating that the exploration and use of space shall be done for the benefit and in the interests of all humankind and the freedom to explore and use outer space.[150] Article I may be considered of the utmost importance, as indicated by the Cologne Commentary on Space Law, but it was also thought to be one of the most controversial.[151] The Cologne Commentary on Space Law held that the common heritage principle brings Article I and the Outer Space Treaty "in line with the legal regulation of human activities in other common spaces, such as the activities on the High Seas and the Deep Sea Bed."[152]

"[T]he recommendatory 1996 UN Space Benefits Declaration" further expanded on Article I of the Outer Space Treaty,

146. *Id.*
147. *Id.* at 100.
148. *Id.* at 99.
149. Outer Space Treaty, *supra* note 9, at art. I.
150. *Id.*
151. COLOGNE COMMENTARY ON SPACE LAW: OUTER SPACE TREATY, VOLUME 1 173 (Stephan Hobe et al. eds., Olga A Volynskaya et al. trans., 2017).
152. *Id.*

particularly its Benefit Clause.[153] In reiterating the province of humankind principle in the Declaration's Preamble, the Preamble goes on to hold that "[s]tates are free to determine all aspects of their participation in international cooperation in the exploration and use of outer space on an equitable and mutually acceptable basis."[154] It requires "full compliance with the legitimate rights and interests of the parties concerned."[155]

Article IV paragraph 1 of the Moon Agreement also restates the province of mankind principle in close proximity to the Benefit Clause.[156] However, Article XI paragraph 1 declared the Moon, celestial bodies, and their natural resources are included in the common heritage of mankind.[157] Article XI paragraph 5, though, states that nations should undertake and establish an international regime "to govern the exploitation of natural resources of the [Moon] as such exploitation is about to become feasible."[158] Interpretations of the common heritage of mankind, however, are dependent on the context of its use and purpose for future regulatory application.[159] Additionally, the common heritage of mankind has no further effect on the present exploitation and use of lunar resources apart from the establishment of a future exploitation regime.[160] An expectation exists that parties bound to the Moon Agreement should make a good faith effort to organize an international conference and agree upon an international regime.[161] However, parties are not bound to reach an agreement, and such a conference may reject the principle of the common heritage of mankind altogether.[162] A new, more liberal scope may even be applied to the principle.[163] Based on this analysis, the common heritage principle is in flux, and its application to space is still uncertain.

153. G.A. Res. 51/122, Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the interest of All States, Taking into Particular Account the Needs of Developing Countries (Dec. 13, 1996).
154. *Id.*
155. *Id.*
156. Moon Agreement, *supra* note 41, at art. IV, para. 1.
157. *Id.* at art. XI, para. 1.
158. *Id.* art. XI, para. 5.
159. MASSON-ZWAAN & HOFMAN, *supra* note 20, at 101.
160. *Id.*
161. *See id.*
162. *Id.*
163. *Id.*

B. *Why the Law of the Sea Is Not Fit for Space*

Outer space and the Earth's oceans share many similarities, which makes the law of the sea appear ideal to build a suitable system to guide property rights in outer space. However, the common heritage principle embedded in UNCLOS III presents an obstacle to granting the freedom to exploit outer space resources. The original authors of the Moon Agreement also agreed with the sentiment of UNCLOS III, which heavily influenced the Moon Agreement.[164] One particular note taken from UNCLOS III was the regulation of seabed mining.[165] The Moon Agreement intended that resources falling outside the territories of nation-states—in this case, off-Earth resources—belong to the common heritage of mankind.[166] Developed nations are concerned with the possible commercial exploitation of outer space and the protection of such investments.[167]

Some argue that the common heritage principle found in UNCLOS III conflicts with the purpose of the Outer Space Treaty because the meaning of the common heritage principle is unclear.[168] Moreover, they claim that interpretations of the common heritage principle clash between developed and developing countries.[169] Developing nations interpreted the common heritage principle to mean that all space resources are the common property to all nations, and international control is necessary for redistributing wealth and technology between nations.[170] The United States, however, took a more *laissez-faire* approach and interpreted the common heritage principle to mean free access in exploring and exploiting space resources.[171]

164. Rand Simberg, *Property Rights in Space*, THE NEW ATLANTIS, https://www.thenewatlantis.com/publications/property-rights-in-space [https://perma.cc/XY2M-U8VG] (last visited Jan. 19, 2020).

165. *Id.*

166. *Id.*

167. Sebastian Gibson, *Space Law: Guide to Development of Space Resources on Asteroids and the Moon*, HG.ORG, https://www.hg.org/legal-articles/space-law-guide-to-development-of-space-resources-on-asteroids-and-the-moon-52077 [https://perma.cc/95MG-8SRP] (last visited Jan. 19, 2020).

168. Allen Duane Webber, *Extraterrestrial Law on the Final Frontier: A Regime to Govern the Development of Celestial Body Resources*, 71 GEO. L.J. 1427, 1436 (1983).

169. *Id.* at 1436–37.

170. *Id.*

171. *Id.* at 1437. The United States has long petitioned against government intervention in labeling resources as belonging to the common heritage principle as

In drafting a treaty, agreement on definitions is necessary to create reciprocal commitments between the signatories.[172] Thus, signatories are only bound to their respective interpretations at the signing of the treaty.[173] Drafters would likely impute the UNCLOS III interpretation of the common heritage principle to the Moon Agreement.[174] As defined in the UNCLOS agreements, the common heritage principle holds that all nations are entitled to a share in profits from the exploitation of seabed resources.[175] UNCLOS III empowers the Sea Bed Authority, which is, in part, controlled by a two-thirds vote of signatory nations,[176] to maintain the extraction of seabed resources in conformity to the common heritage principle.[177] In attempting to reconcile the interpretations, the developing nations would likely win out as they did in UNCLOS III because of their superior number compared to already established space-faring nations.[178] Thus, space-faring nations would be outvoted for their proposed interpretation and be bound to the developing nations' definition of the common heritage principle.[179] This development would, therefore, operationally incorporate UNCLOS III's interpretation of the common heritage principle into the Moon Agreement because of the desire of developing nations to have a system similar to the Sea Bed Authority.[180]

Under this approach, there are two points of contention with the Outer Space Treaty principles.[181] The first issue is that developing nations regard the benefit for all of mankind as meaning ownership by all nations.[182] Second, the owner not only has the right to use their property, but also to exclude others who are opposed by the majority of owners.[183]

witnessed in denial to ratify the UNCLOS III agreement.

172. Webber, *supra* note 168, at 1437.
173. *Id.*
174. *Id.* at 1438.
175. UNCLOS, *supra* note 73, at art. 90.
176. *Id.* at arts. 159–60.
177. *See id.* at arts. 156–57, 170.
178. Webber, *supra* note 168, at 1438.
179. *Id.*
180. *Id.* at 1439.
181. *Id.* at 1441.
182. *Id.*
183. *Id.*

Others argue, however, that accepting the developing countries' interpretation of mankind to mean all nations violates the Benefit Clause of the Outer Space Treaty.[184] Each nation would perceive itself to be an owner in which they are entitled to a vote and a share of the benefits.[185] However, a plurality of nations would likely fail to represent humankind adequately, and the plurality alone would achieve their interest.[186] Developing nations—who would likely make up the majority of voting members and desire a regime similar to the International Seabed Authority—could then require that the nations in defiance of the Benefit Clause receive the profits of space activities.[187] This provision was not meant to reward those that did not contribute to or take part in the risk of the activity.[188] In contrast to the common heritage principle, the "benefit" provision does not mandate wealth distribution in which only a segment of humankind receives a benefit.[189]

Common ownership would also impact the free use principle of the celestial body.[190] By requiring a majority approval, free use would be limited without permission.[191] As the majority, developing nations' interest could hamper the development of celestial exploitation because of the competition of their mining operations with the importation of new minerals.[192] The ability of developing nations to limit or eliminate the free use principle directly conflicts with the general purpose of the Outer Space Treaty.[193]

An implementation of the law of the sea before the advocation of restrictions seems to be a more relevant model than the adoption of the UNCLOS agreement. The space law regime today bears substantial similarities to the ocean law following the 1958 UNCLOS but preceding the 1982 UNCLOS III agreement.[194] At that time, an

184. *Id.*
185. *Id.*
186. *Id.* at 1441–42.
187. *Id.*
188. *Id.*
189. The Outer Space Treaty explicitly grants the freedom to explore and to use outer space and that all activities do not have to be in the interest of the global community. Webber, *supra* note 168, at 1442; OGUNSOLA OGUNBANWO, INTERNATIONAL LAW AND OUTER SPACE ACTIVITIES 65 (1975).
190. Webber, *supra* note 168, at 1442.
191. *Id.*
192. *Id.*
193. *Id.*
194. Tannenwald, *supra* note 63, at 395.

agreement existed on vague freedoms of the sea, but little could be agreed upon otherwise.[195] States also possessed the ability to pick and choose from which of the 1958 provisions they would adhere to as states can do now among the existing outer space treaties.[196] Also, as with the pre-1982 UNCLOS agreement, a relatively small number of nations with the ability to exploit the realm defined as the space regime.[197] Today's space law is characterized by broad principles that are exposed to unilateral interpretation.[198]

A new space law regime cannot adopt the common heritage principle of UNCLOS if private entities are to conduct space activities successfully. A new regime must take into account the interest of all of humankind and not the will of the developing majority nations. For a successful transition, the new governing authority must be fair and allow the development of space mining to occur equitably. The core of the law of the sea is, therefore, unsatisfactory as the building blocks of a future space regime.

C. *The Antarctica Model Cannot Survive in Space*

The main goal of restructuring space law and creating a new space authority is the exploitation of celestial resources. The Antarctica Treaty appears to be a suitable candidate to form the principles of space law because its purpose is to protect the peaceful exploration of a hostile environment.[199] However, the Antarctica Treaty model lacks an authority to govern the exploration and development of space; the treaty only allows for consultation between the signatories in a conference mechanism.[200]

The conference structure of the Antarctica Treaty proves to be an inadequate model for the development of space for two reasons.[201] First, the Antarctica Treaty proves untested for providing guidance in this regard because few resources[202] worthy of development have been found in Antarctica.[203] In the instance of a party aggressively

195. *Id.*
196. *Id.*
197. *Id.*
198. *Id.*
199. Webber, *supra* note 168, at 1449.
200. *Id.*
201. *Id.*
202. *Id.*
203. *Id.*

appropriating territory in Antarctica, the conference mechanisms also remain unproven.[204] Following the ratification of the Antarctica Treaty, several countries still claimed possession to territory in Antarctica, thus displaying the faults of the agreement.[205]

Second, the exponential increase in cost for the mining of space resources, compared to mining in Antarctica, requires greater reassurance in the right to mine in order to entice investors.[206] The lack of a governing authority to facilitate the mining of space is undesirable for private entities risking their investment.[207] The Moon Agreement and the law of the sea fail to provide a cohesive remedy for addressing the faults with space law. A new regime that is not based on prior multilateral agreements is necessary for the development of a new regime.[208]

IV. PROPOSED SOLUTIONS AND RECOMMENDATION

The current regimes of international law addressing natural resources on Earth fail to provide an adequate framework to address the relatively new issues of space law and to amass adequate support. The failure of the UNCLOS resolution to achieve widespread ratification must not be repeated if a new international cooperative is to garner international support among both the major space-faring nations and those countries still developing space programs. Potentially exhausting all the global resources could be mitigated or prevented if private investors had the backing and security of a global community. An authoritative body, unlike the non-confrontational conference arrangement in the Antarctica Treaty, is needed to resolve disputes and prevent the appropriation of celestial bodies.

In order to facilitate a fair and cooperative process, an assembly of both developed and developing nations with and without space launching capabilities could issue authorization permits for mining to private entities. The U.S. Space Act provides a foundation for a new regime. To facilitate justice, a tribunal of rotating nations would enforce the permits and punish those who violate international

204. *Id.* at 1449–50.
205. *Id.*
206. *Id.* at 1450.
207. *Id.*
208. *Id.*

space law. A method of arbitration could also be established to ensure a fair process in which the group of nations will oversee.

A. *Creation of a Multinational Organization*

Article XI paragraph 5 of the Moon Agreement states that signatories should create an international regime to oversee the mining and extraction of celestial resources.[209] There is no further guidance as to structure; the Moon Agreement simply states that an international regime should be created once it becomes feasible to exploit resources.[210] The drafters likely envisioned an international regime to monitor and promote the peaceful exploitation of celestial resources.

The purpose behind establishing an impartial, multinational organization is that it allows for cooperation between space and non-space faring countries. By including both groups, the interests of humankind as a whole may be taken into account. The organization will represent an equal number of space and non-spacefaring nations so that no one side could influence the decisions. A neutral third party, such as an expert in space law, would provide the last vote. Multilateral agreements will help ensure the harmonizing of national legislation and aid in the elimination of uncertainties regarding private property rights. The U.S. Space Act provides a guide for establishing the roles of the new regime.

Private entities will apply for a permit with a proposal, which the board has the discretion to approve. Because the committee is composed of different nations, the citizen requirement is moot. The proposal should detail which resources will be mined, the location of the celestial body, and the proposed method of extraction. Should the committee approve the proposal, the private entity would receive a license permitting extraction to that celestial body. The permit grants the property rights for the collection and transportation of the gathered resources.

The fees from these permits could be utilized for the improvement of science and engineering education in developing countries or for research funds for nations whose citizens are venturing into space. This would help distribute the fees and encourage developed nations to continue funding research and development at

209. Moon Agreement, *supra* note 41, at. XI, para. 5.
210. *Id.*

their discretion. The distribution of fees to developing nations may also aid in offsetting the revenue lost by importing the celestial resources.

B. *Enforcement of Property Rights*

The granting of new property rights will likely create numerous issues, from trespassing to piracy. Currently, nations do not possess jurisdiction above the atmosphere. Therefore, a new tribunal that oversees disputes and determines the proper remedy is necessary. Whether through a trial framework or a form of alternative dispute resolution, a court with jurisdiction in space must be available for private parties seeking legal action.

The framework for the International Space Station demonstrates that nations possess jurisdiction for their nationals in space. An authoritative governing structure could hold nations accountable by imposing fines, reducing permits, and other restrictions. As nations possessed jurisdiction over their sailing vessels while on the high seas, nations now should be seen as the keeper for their vessels into space. This would also allow for binding judgments should a nation fail to police their own nationals.

The issue of enforcement would occur if there were conflicting claims or a breach of space law. One solution is the creation of a tribunal in which private entities could bring claims. A panel of judges or administrators would hear the matter and issue a decree. These judges would be selected from a pool of adjudicators whose interests should be neutral to the conflict. To safeguard neutrality, the pool of judges should be multinational and comprised of experts in space and international law. In the instance of an appeal, the panel could be assembled *en banc* so that all judges of the court are present to hear the case. Ensuring neutrality will protect the integrity of the court and prevent the interest of parties from tainting the ruling.

Another method, that is currently employed by some international agreements, would be a provision to arbitrate disputes. By agreeing to arbitration at the onset of the process, parties will know what to expect in the instance of a claim. Other forms of alternative dispute resolution may also be available if the parties were to seek another means of resolving the dispute.

V. CONCLUSION

If a private entity's property rights are to be protected in outer space, the current regime of space law requires a significant restructuring, if not a rebirth. The Outer Space Treaty and its relevant influences are too ambiguous regarding property. Current multilateral agreements contain too many restrictions or do not adequately provide a sufficient base to model the new space regime. While the law of the sea is an enticing starting point, the common heritage principle found within the UNCLOS III agreement removes the law of the sea from the running as a viable foundation for a new regime. The Antarctica Treaty is also disqualified because it lacks a strong authoritative body to resolve disputes.

A new space regime seems like the most appropriate course of action due to the development of space technology since the launch of Sputnik. With a new multinational organization to oversee and monitor space activities, private entities would receive the recognition and assurance in property rights that they desire. Along with the new organization, a form of dispute resolution is required to resolve claims originating in space because no nation has jurisdiction above the atmosphere. With current needs that cannot be solved here on Earth, the exploitation of an almost infinite resource should not be denied.