Cite as: 17 MINN. J. INT'L L. 475 (2008)

## Note

# The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space

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## INTRODUCTION

In late 2000, the United Nations General Assembly voted on a resolution titled "Prevention of an Arms Race in Outer Space."[1] The measure passed with 163 Yeas, zero Nays, and three abstentions.[2] The United States abstained along with its allies Israel and the Federated States of Micronesia.[3] In January 2001, a commission assessing United Sates national security in space headed by then Defense Secretary Donald Rumsfeld reported that the United States should "ensure that the President will have the option to deploy weapons in space."[4] The Rumsfeld Commission warned that the United States was vulnerable to a "Space Pearl Harbor."[5] In June 2002, the United States officially withdrew from the thirty-year-old Anti-Ballistic

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1. G.A. Res. 55/558, ¶ 7, U.N. Doc. A/RES/55/558 (Nov. 20, 2000).

2. Press Release, Gen. Assembly, General Assembly Adopts 49 Disarmament, International Security Texts on Recommendation of its First Committee, U.N. Doc. GA/9829, (Nov. 20, 2000).

3. *Id.*

4. Report of The Commission to Assess United States National Security Space Management and Organization xii (2001) [hereinafter Rumsfeld Commission].

5. *Id.* at vii, xiii, xv.

Missile Treaty,[6] leaving the Outer Space Treaty as the "primary legal bar on space weaponization."[7] In August 2006 the United States announced a new space policy which reaffirmed its dedication to the peaceful uses of space, but also stated a policy initiative of denying the use of space to adversaries if necessary.[8] By December 2006, when the United Nations General Assembly voted on the "Transparency and Confidence-Building Measures in Outer Space Activities" resolution,[9] the United States was the lone dissenter.[10] Finally, in January 2007, China successfully launched a missile from earth to destroy an obsolete Chinese satellite, sending a clear message of its ability to destroy objects in orbit.[11] The United States submitted a formal complaint; the United Nations took no action in response.[12]

The possibility of space becoming another forum for warfare has long been a fear of the international community.[13] Although many treaties have addressed weapons in space,[14] space actors have been testing the limits of these treaties more and more

6. The United States officially withdrew from the ABM Treaty on June 13, 2002. *See* Press Release, The White House, Office of the Press Sec'y, Statement by the President (June 13, 2002), http://www.whitehouse.gov/news/releases/2002/06/20020613-9.html; *see generally* Treaty on the Limitations of Anti-Ballistic Missile Systems, art. V, U.S.-U.S.S.R., May 26, 1972, 23 U.S.T. 3435 (prohibiting developing, testing, or deploying ABM systems in outer space).

7. Andrew T. Park, *Incremental Steps for Achieving Space Security: The Need for a New Way of Thinking to Enhance the Legal Regime for Space*, 28 HOUS. J. INT'L L. 871, 874 (2006). *See* The 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]. The Outer Space Treaty prohibits the placement of weapons of mass destruction in outer space by any means. *Id.*

8. United States National Space Policy, Aug. 31, 2006, http://ostp.gov (click on "White House News" drop down and select "US National Space Policy") (last visited Feb. 18, 2008) [hereinafter 2006 Space Policy].

9. G.A. Res. A/61/PV.67, U.N. Doc. A/61/PV.67 (Dec. 6, 2006).

10. The resolution was approved by a vote of 175 in favor to one against (United States), with no abstentions. Press Release, Gen. Assembly, Arms Trade Treaty, 'Nuclear-Weapon-Free World,' Outer Space Arms Race Among Issues, as General Assembly Adopts 54 First Committee Texts, U.N. Doc GA/10547 (Dec. 6, 2006).

11. Joseph Kahn, *A New Player at Star Wars: China Shows Assertiveness In Reported Weapons Test*, N.Y. TIMES, Jan. 20, 2007, at A7. It should be noted that the United States and the Soviet Union both successfully destroyed satellites in orbit with terrestrial launched missiles in the 1980s. *Id.*

12. David E. Sanger & Joseph Kahn, *U.S. Tries to Interpret China's Silence Over Test*, N.Y. TIMES, Jan. 22, 2007, at A7.

13. *See generally* Outer Space Treaty, *supra* note 7, ¶ 4.

14. *Id.* at art. IV.

frequently. The United States has stated that space warfare is inevitable.[15] This possibility is especially troubling because the global economy depends heavily on outer space.[16] National defense, global communications, an ever growing commercial space industry, international flights, and the internet all depend on satellites orbiting in outer space.[17] These satellites make obvious first targets for any space arms race.[18] The Outer Space Treaty is the last defense against weaponization of space, making it one of the most crucial treaties at this time.[19] In light of its importance, the Outer Space Treaty deserves a critical review. Part I of this Note discusses the evolution of the current body of space law, Part II argues that the current body of space law is inadequate, and Part III presents principles necessary in any international instrument on space law that hopes to successfully delay the introduction of weapons to space.

## I. THE ORIGINS OF SPACE LAW

There is no codified compilation of international space law.[20] A legal regime has arisen primarily from the Outer Space Treaty, subsequent supplementary treaties, and international law.[21] Much of international space law is the result of the Cold War and fears of being left behind in the space race.[22] While space law continues to evolve, the ethos upon which space law

15. Karl Grossman, *The Phantom Menace*, EXTRA!, May/June 1999, *available at* http://www.fair.org (in search box enter "Phantom Menace" to access article).

16. In 2004 commercial space industries had a cumulative economic impact of more than $98 billion in the United States alone. OFFICE OF COMMERCIAL SPACE TRANSP., FED. AVIATION ADMIN., ECONOMIC IMPACT OF COMMERCIAL SPACE TRANSPORTATION ON THE U.S. ECONOMY: 2004, at 9 (2004). This figure does not include the economic impact made possible by global communications or advancements resulting from space exploration.

17. *See* Rumsfeld Commission, *supra*, note 4, at viii (discussing the dependence of the United States on space and the need to protect those vulnerabilities).

18. *Id.*

19. *See* Park, *supra* note 7, at 874.

20. *See* Ty S. Twibell, *Space Law: Legal Restraints on Commercialization and Development of Outer Space*, 65 UMKC L. REV. 589, 592 (1997) (noting that space law is generally derived from international law, multi-lateral treaties, and international agreements). Within the United States, space law is heavily regulated by numerous governmental agencies and statutes. *See id.* at 605–06 (discussing the role of government agencies in regulating domestic space law).

21. *Id.* The treaties and international law from which space law is derived is discussed more fully *infra* in Parts I.B–C.

22. *See* Twibell, *supra* note 20, at 591–92 (noting that the U.S./Soviet Union power struggle had enormous implications on the initial structure of space law).

was constructed may prove to be an albatross that slows its advance, destroying the very ideals it purports to uphold. Understanding where space law comes from is crucial to understanding why it will fail and how it can be strengthened.[23] This section explores the fears that led to the current body of space law, the treaties that comprise the law, the historical antecedents drawn upon, and the ways that the law is affecting space actors today.

## A. THE FEARFUL START TO SPACE LAW

In 1957 the Soviets launched Sputnik and rocketed into the Space Age.[24] The phrase "the Space Age" was coined by United States politicians and reporters who recognized that entry into space began an entirely new era for international politics.[25] Within a year, the United States Congress had passed the National Aeronautics and Space Act of 1958 which created NASA and signaled the start of the space race.[26] The United Nations, also realizing the importance of space, quickly established an ad hoc political body to govern the nascent realm of space.[27] The United Nations Committee on the Peaceful Use of Outer Space (COPUOS) has since grown into one of the largest United Nations committees.[28]

The tension of the Cold War was not lost on the United States, the Soviet Union, or the world at large.[29] Both the United States and the Soviet Union, the only two space actors at the time, feared the other's entry to space would allow for a decisive advantage in the Cold War.[30] This fear was balanced, however, against the fear that non-space actors would align themselves against the nation first to enter space.[31] In addition, the rest of the world bore legitimate fears that the two space actors would lay claims upon the entire solar system, leaving

23. *See* Park, *supra* note 7, at 875.

24. *Id.* at 875–76.

25. NATHAN C. GOLDMAN, AMERICAN SPACE LAW 4 (Iowa State Univ. Press) (1988).

26. The National Aeronautics and Space Act, Pub. L. No. 85–568, 72 Stat. 426, 438 (1958).

27. Park, *supra* note 7, at 876.

28. United Nations Office for Outer Space Affairs Home Page, http://www.unoosa.org/oosa/COPUOS/copuos.html (last visited Mar. 7, 2008).

29. Glenn Harlan Reynolds, *International Space Law: Into the Twenty-First Century*, 25 VAND. J. TRANSNAT'L L. 225, 229–30 (1992).

30. *Id.*

31. *Id.*

them forever behind.[32] Over the next two decades, four major space treaties would be signed and ratified under these Cold War fears.[33]

Recognizing the importance of international solidarity, COPUOS sought to approve all treaties by complete consensus.[34] Although the general rules of COPUOS only require a simple majority to pass resolutions, COPUOS decided to allow nations to submit "on-the-record" interpretations of provisions prior to agreeing to them to encourage consensus.[35] Frequently, the on-the-record interpretations were at odds with the interpretation of other nations.[36] Over the years these diverse interpretations have caused the Outer Space Treaty to be interpreted in widely different ways.[37] As the number of nations who were party to COPUOS grew, consensus became more and more challenging to achieve.[38] Hence, more resolutions have been passed by a simple majority, and the lack of consensus—the standard COPUOS once sought—has contributed to the degrading of COPUOS in the international community.[39] The prevailing body of space law was formed from these hurried and forced conditions.

## B. THE TREATIES OF SPACE LAW

The Outer Space Treaty is the foundation of space law.[40] It has been signed by ninety-one nations and is not disputed.[41] The remaining three treaties that comprise space law built upon the Outer Space Treaty's principles to provide more substantive guidelines and rules.[42] A fifth treaty, the Moon Treaty, has been widely rejected.[43] Collectively, the acceptance and rejection of

32. *Id.*

33. For a more detailed examination of these treaties *see infra* Parts I.B.1–2. Note that because the Moon Treaty never acquired wide acceptance it is typically not considered amongst the major space treaties. Twibell, *supra* note 20, at 598.

34. GOLDMAN, *supra* note 25, at 29–30.

35. *Id.*

36. *Id.*

37. The interpretations sometimes contrast starkly. *See infra* Part I.B.1.

38. GOLDMAN, *supra* note 25, at 29–30.

39. *Id.* at 31.

40. Lynn M. Fountain, *Creating Momentum in Space: Ending the Paralysis Produced by the "Common Heritage of Mankind" Doctrine*, 35 CONN. L. REV. 1753, 1761 (2003); Twibell, *supra* note 20, at 592; *see also* GOLDMAN, *supra* note 25, at 70.

41. *See* Outer Space Treaty, *supra* note 7, at Signatory List (available online at http://www.state.gov/t/ac/trt/5181.htm).

42. For a more detailed discussion on these treaties *see infra* Part I.B.2.

43. For a more detailed discussion on the Moon Treaty *see infra* Part I.B.3. The

these treaties has shaped the actions of all nations in outer space.

### *1. The Outer Space Treaty*

The Outer Space Treaty was the first attempt to regulate outer space and establish broad guidelines for space exploration.[44] The treaty recognized "the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes."[45] Although the treaty's seventeen articles cover a range of issues, they essentially regulate the use, occupation, and appropriation of space.[46] The treaty's primary purpose was to preclude any claims of sovereignty in outer space and on celestial bodies.[47]

Because of the differing interpretations of the Outer Space Treaty,[48] the "common heritage" language has been interpreted in two glaringly different ways.[49] For non-space actors, the language is typically interpreted to mean that outer space, all its resources, and any benefits derived there from should be equitably distributed.[50] For space actors, the phrase merely speaks to the optimism inherent in space exploration and places no limitations on them whatsoever.[51]

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Moon Treaty has been ratified and signed by seven nations. Although this is sufficient to make the Moon Treaty valid law, it is only binding against its signatories. Twibell, *supra* note 20, at 597.

44. Eric Husby, *Sovereignty and Property Rights in Outer Space*, 3 J. INT'L L. & PRAC. 359, 362 (1994). Both the United States and the Soviet Union claim original parentage of the Outer Space Treaty. The Soviet Union regards it as a late acceptance of a 1958 proposal for an international treaty guaranteeing peace and cooperation in space. The United States regards it as an expansion of President Johnson's 1966 proposal on a treaty governing exploration of the moon. *Id.* at n.8 (citing H.G. Darwin, *The Outer Space Treaty*, 42 Brit. Y.B. Int'l L. 278 (1967)).

45. *Id.* (quoting the Outer Space Treaty at 2411).

46. Julie A. Jiru, *Star Wars and Space Malls: When the Paint Chips off a Treaty's Golden Handcuffs*, 42 S. TEX. L. REV. 155, 166 (2000).

47. Husby, *supra* note 44, at 361–62.

48. *See* GOLDMAN, *supra* note 25, at 29–30 (discussing the often conflicting on-the-record interpretations). *See supra* note 44 and accompanying text.

49. *See* Fountain, *supra* note 40, at 1762.

50. *Id.*

51. Husby, *supra* note 44, at 364. When the Outer Space Treaty was ratified, the Committee on Foreign Relations stated that "nothing in Article I [of the Outer Space Treaty] diminishes or alters the right of the United States to determine how . . . it shares the benefits and results of its space activities." *Id.* Similarly, the Soviet Union interpreted Article I to have "no precise definition" and that any "participation in the international space arena depended ultimately on their will." *Id.*

A similar disagreement arises with the Outer Space Treaty's non-appropriation clause.[52] The non-space actors, again, argue that outer space resources cannot be lawfully appropriated because they belong to all mankind.[53] This interpretation acts as a virtual bar to mining outer space because one would need the permission of all mankind to proceed.[54] Space actors argue that the non-appropriation clause refers to the permanent appropriation of celestial bodies by sovereign nations, not the consumption of resources by private actors.[55] Under the latter understanding, private space actors would be allowed to mine space minerals.[56]

### 2. *The Expansionary Treaties*

The Rescue Treaty,[57] Space Liability Treaty,[58] and Space Registration Treaty[59] each expanded on the substantive provisions of the Outer Space Treaty. The Rescue Treaty expands upon Article V of the Outer Space Treaty and satisfies "concerns of international cooperation and humanity" by creating procedures for returning both astronauts and space objects to their sovereign nation.[60] The Space Liability Treaty provided a more detailed framework, ameliorating the concerns of non-space actors who feared bearing the cost of a space accident over its territory when it was not posing the same risk to space actors.[61] The Space Registration Treaty formalized who and what must be registered with the United Nations.[62] In

52. Outer Space Treaty, *supra* note 7, at art. II.
53. Fountain, *supra* note 40, at 1762–63.
54. *Id.*
55. *Id.*
56. *Id.*
57. The 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 [hereinafter Rescue Treaty].
58. Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389 [hereinafter Space Liability Treaty].
59. Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695 [hereinafter Space Registration Treaty].
60. GOLDMAN, *supra* note 25, at 76–77.
61. *Id.* at 79. Article VI of the Space Liability Treaty makes damage from space accidents strict liability unless the accident "resulted either wholly or partially from gross negligence or [the] intent to cause damage on the part of a claimant State or of natural juridical persons it presents." Space Liability Treaty, *supra* note 58, at art. VI. Therefore, absent malfeasance on the part of a state, it is absolutely protected from bearing the cost of a space accident by another nation.
62. GOLDMAN, *supra* note 25, at 83. The Space Registration Treaty requires

expanding upon Article VIII of the Outer Space Treaty,[63] the Space Registration Treaty assists in assessing liability and the eventual cleanup of space debris by identifying ownership.[64]

Each of the expansionary treaties expanded upon a general principle of the Outer Space Treaty to give it a more substantive and workable form as an enforceable body law.[65] It was a natural expectation that Article V of the Outer Space Treaty which required nations to render astronauts "all possible assistance in the event of an accident," would have to be expanded into a more detailed treaty.[66] As such, each of the treaties was ratified between 1968 and 1975.[67]

### *3. The Failed Moon Treaty*

The Moon Treaty sought to expand upon the substantive provisions of the Outer Space Treaty that restricted the appropriation of outer space and celestial bodies.[68] The treaty aimed too high, however, and was never ratified by any space actor.[69] Although the Moon Treaty is valid law, it is in effect only against its signatories and is therefore not considered a part of space law by American commentators.[70]

The Moon Treaty's primary goal was to unambiguously deny property rights in outer space to both sovereign nations

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that the name of the launching state, the space vehicle, the date and location of launch, the orbital parameters, and the purpose of the space object be registered. Space Registration Treaty, *supra* note 59.

63. While the Outer Space Treaty does not expressly require the registration of space objects, it protects ownership of space objects to the state in which the object is registered. Outer Space Treaty, *supra* note 7, at art. VIII.

64. GOLDMAN, *supra* note 25, at 83.

65. *See* GOLDMAN, *supra* note 25, at 76–77, 79, 83; Outer Space Treaty, *supra* note 7, at art. VIII.

66. *Cf.* Outer Space Treaty, *supra* note 7, at art. V *and* Rescue Treaty, *supra* note 57.

67. The Rescue Treaty went into force in 1968 and now has eighty-nine ratifications, the Space Liability Treaty in 1972 and now has eighty-four ratifications, and the Space Registration Treaty in 1975 and now has forty-seven ratifications. United Nations Office for Outer Space Affairs, United Nations Treaties and Principles on Space Law, http://www.unoosa.org/oosa/en/SpaceLaw/treaties.html (last visited on Mar. 20, 2008).

68. The Agreement Governing the Activities of the States on the Moon and other Celestial Bodies, *opened for signature* Dec. 18, 1979, G.A. Res.34/68, 34 U.N. GAOR Supp. No. 46 at 77, U.N. Doc. A34/46 [hereinafter Moon Treaty].

69. GOLDMAN, *supra* note 25, at 87; *see also supra* note 43 and accompanying text.

70. Twibell, *supra* note 20, at 597; *see also supra* note 43 and accompanying text.

and private actors.[71] The drafters of the Moon Treaty saw the inevitable exploitation of space and introduced the "common heritage of mankind" doctrine to ensure that the benefits of space would be shared equally amongst mankind.[72] Under the plainest reading, this would go so far as to threaten intellectual property discovered in space.[73] Proponents of the Moon Treaty claim that it is simply an extension of the Outer Space Treaty, while opponents claim that it further restricts valuable rights.[74] The latter interpretation appears to be the dominant one, not only because it is universally held amongst the space actors, but because the Moon Treaty does abrogate many of the "on-the-record" interpretations the Outer Space Treaty allowed.[75]

### C. HISTORICAL ANTECEDENTS TO SPACE LAW

The language of the Outer Space Treaty and the treaties that followed borrowed heavily from other treaties already in existence. Much of the substantive language was adapted from terrestrial treaties that faced similar obstacles to those presented by space.[76] The international community drew on their experiences regulating other international commons, international waters, and terrestrial treaties that had acquired space provisions.[77]

Many of the goals of space law are mirrored in the Antarctic Treaty System, a series of treaties that holistically protect Antarctica and suspend sovereign claims over the continent.[78]

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71. Twibell, *supra* note 20, at 598–99. *See generally* Moon Treaty, *supra* note 68, at art. 4 (requiring that the use of the moon "shall be carried out for the benefit . . . of all countries, irrespective of their degree of economic or scientific development.").

72. Twibell, *supra* note 20, at 597–600. *See generally* Moon Treaty, *supra* note 68, at arts. 1, 11.

73. Twibell, *supra* note 20, at 598.

74. Husby, *supra* note 44, at 368–70.

75. *See supra* Part I.A. (discussing the "on-the-record" interpretations more fully).

76. *See* Husby, *supra* note 44, at 362 (discussing the adaptation of the Antarctic Treaty and the Test Ban Treaty to create the Outer Space Treaty's substantive provisions and formal clauses, respectively).

77. *E.g.*, The Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, Aug. 5, 1963, 14 U.S.T. 1313, 480 U.N.T.S. 43 [hereinafter Test Ban Treaty]. The Test Ban Treaty prohibited the testing of nuclear weapons in outer space.

78. The Antarctic Treaty System is comprised of the Antarctic Treaty, 12 UST 794 (1959); the Agreed Measures for the Conservation of Antarctic Fauna and Flora, 17 UST 996 (1964); the Convention for the Conservation of Antarctic Seals, 29 UST

The Treaty System preserves Antarctica for scientific study,[79] protects the environment,[80] and provides guidelines for dealing with mineral rights.[81] Although the Treaty System has been a success in preserving Antarctica while encouraging its use for scientific discovery, the Treaty System has discouraged all mining on the continent.[82]

Space law also borrowed from various treaties governing the high seas, which have been treated as an international commons, open to all nations for travel and trade.[83] Cooperation upon the high seas was achieved primarily due to the great difficulty in defending and occupying a stretch of sea.[84] If it is impracticable for a nation to defend territory as their own, they are better off defending the right for all nations to use it freely.[85] The vacuum of space, which is far too vast to ever be occupied, is likewise best defended as communal property.

The main treaty controlling international waters is the Convention on the High Seas.[86] The Convention advocates free use of the high seas with "reasonable regard to the interests of other States in their exercise of the freedom of the high seas."[87] Free use extends well beyond navigation and allows consumption of resources in international waters.[88] The Outer

441 (1972); and the Convention and Conservation of Antarctic Marine Living Resources, 33 UST 3476 (1980). Rosanna Sattler, *Transporting a Legal System for Property Rights: From the Earth to the Stars*, 6 CHI. J. INT'L L. 23, 32 n.50 (2005). The Antarctic Treaty System also suspends claims of ownership of Antarctica made by several nations. *Id.* at 33. *See also* Jiru, *supra* note 46, at 162 (noting that seven nations have made claims that cover 85% of Antarctica).

79. Jiru, *supra* note 46, at 162.

80. *Id.*

81. *Id.* The scope of the Outer Space Treaty is very similar to that of the Antarctic Treaty System because the former was based upon the latter as a guide. Twibell, *supra* note 20, at 595.

82. The Antarctic Treaty System treats Antarctica as a preserve and does not allow for mining. A proposed treaty, the Antarctic Mineral Convention, would have allowed mining to occur upon the unanimous consent of all signatories. Jiru, *supra* note 46, at 162–63. This treaty is not in force due to a lack of support. *Id.*

83. 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, 694 (2004).

84. *Id.*

85. *Id.*

86. Law of the Sea (Convention on the High Seas), Apr. 29, 1958, 13 U.S.T. 2312, 450 U.N.T.S. 82.

87. *Id.* at art. II. The Convention goes so far as to require coastal nations to grant land-locked nations free access to the high seas. *Id.* at art. III.

88. The Convention expressly includes the freedom of fishing, laying submarine cables and pipelines, flying over the high seas, and any other freedoms recognized by general principles of international law. *Id.* at art. II. The only limitation on these

Space Treaty adopted some of the language of the Convention on the High Seas for its own provisions.[89] Its definition of free use, however, has not been interpreted as broadly as the Convention on the High Seas.[90]

The Convention was ratified before mining the seabed was a reality and so failed to address the issue.[91] In the late 1960s, when seabed mining had become feasible, the United Nations created the International Seabed Authority in response.[92] The Seabed Authority was the first to use the terminology "common heritage of mankind" in requiring the economic benefits of seabed mining to be shared "on a non-discriminatory basis for the benefit of mankind as a whole."[93]

Much like the Moon Treaty, the United States and other developed nations refused to agree to the requirements of the International Seabed Authority which abrogated the rights granted by the Convention of the High Seas.[94] Instead, the United States created an independent system (via the 2000 "Seabed Act") for regulating seabed exploitation as a temporary measure until a "widely acceptable Law of the Sea Treaty" was created.[95] The Seabed Act defends its existence by arguing that any interpretation of "common heritage of mankind" that requires communal sharing of profits discourages investment.[96] Because it will take years of development before recovery of minerals is possible, this act protects and encourages investments now.[97]

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freedoms is that they be exercised with the interests of other nations in mind. *Id.*

89. Twibell, *supra* note 20, at 595.

90. *See supra* Part I.B.1.

91. Buxton, *supra* note 83, at 694.

92. *Id.*

93. *Id.* at 695. *See* Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982 pmbl., July 28, 1994, 33 I.L.M. 1309, 1836 U.N.T.S. 3.

94. Buxton, *supra* note 83, at 695–96. In addition to sharing profits, the International Seabed Authority required mandatory transfers of technology and employed a voting structure that gave all nations equal control regardless of their economic and technological capabilities. *Id.* Although the Seabed Act came after the development of space law, and is not therefore an antecedent to space law, it offers insights into the future of space law.

95. Deep Seabed Hard Mineral Resources Act, 30 U.S.C. § 1401(a)(8) (2000) [hereinafter Seabed Act]. The Seabed Act is similar to the International Seabed Authority on many of its substantive provisions, including protections for the environment, accidents, and available legal actions. *See* Sattler, *supra* note 78, at 36–37.

96. *See* Jiru, *supra* note 46, at 171 n.39 (citing the reasons the United States abstained from signing the treaty for the International Seabed Authority).

97. The Act encourages investment by guaranteeing that profits will not be

The Seabed Act, like the International Seabed Authority, requires an actor who wishes to mine the seabed to apply for a permit.[98] The permit is a twenty-year grant to mine an area of the seabed of a size determined by the permit holder's "estimated production requirements."[99] If within ten years of the issuance of the permit the holder has not harvested commercial quantities of mineral or shown cause, the permit is terminated.[100] In this manner, those who can make valuable use of a resource are rewarded and those who cannot are forced to surrender their right.

### D. MODERN SPACE LAW AND MODERN SPACE POLICIES

In 2001, the Rumsfeld Commission reported that the United States was "more dependent on space than any other nation."[101] It recommended using the nation's space capabilities to support "domestic, economic, diplomatic and national security interests."[102] In January 2004, President George W. Bush created a commission to hold public hearings and explore ways to expand space exploration, discovery, and commercialization by private entities.[103] The Presidential Commission recommended creating a $100 million to $1 billion prize for the first private actor to place and sustain humans on the moon for a specified period of time.[104] The Presidential Commission also found that the lack of private property rights in space threatened to "strangle a nascent space-based industry in its cradle; no company will invest millions of dollars in developing a product to which their legal claim is uncertain."[105] All of this

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garnished for the "common heritage of mankind." *See* Sattler, *supra* note 78, at 36. The very realistic concerns raised by the Act parallel exactly those raised *infra* Part III.A.

98. 30 U.S.C. § 1412 (2000).

99. 30 U.S.C. § 1413(a)(2)(E)(ii)(II) (2000).

100. 30 U.S.C. § 1417(b) (2000).

101. Rumsfeld Commission, *supra* note 4, at 18.

102. *Id.* at 27.

103. The Commission on Implementation of United States Exploration Policy [hereinafter Presidential Commission]. Sattler, *supra* note 78, at 23–24.

104. Sattler, *supra* note 78, at 24. This prize is inspired by the 2004 Ansari X-Prize which awarded $10 million to SpaceShipOne for achieving suborbital flight twice in one week. *Id.* at 24–25. The X-Prize, now sponsored by Google, is offering $20 million to the first private actor to land a robot on the moon and complete various missions. X PRIZE Foundation, Google Lunar X PRIZE, http://www.googlelunarxprize.org (last visited Mar. 11, 2008).

105. Sattler, *supra* note 78, at 27.

culminated in the new United States space policy.[106] While the policy purports to uphold the values of the Outer Space Treaty, its deliberate goals are more in line with the suggestions from the Rumsfeld and Presidential Commissions.[107]

Despite a lack of legal protections, the space industry has grown dramatically. Since 1996 the commercial space industry has exceeded revenue from government-funded space activity.[108] Virgin Galactic, owned by Richard Branson, has already sold the first 100 tickets for tourist flights into space at $210,000 per seat.[109] The first flights are scheduled for launch in 2008 and Virgin Galactic is prepared to invest another $100 million to develop this business.[110] And yet, the budding space industry has barely scratched the surface. Through radio astronomy, scientists have been able to analyze the asteroid belt orbiting beyond Mars.[111] The resources in the belt alone have an estimated value of $100 billion for every person on earth.[112]

## II. THE OUTER SPACE TREATY IS INADEQUATE TO GOVERN SPACE

For better or worse, the Outer Space Treaty is the cornerstone of space law.[113] Any analysis of space policy ought to critically evaluate the treaty to determine if it is a stable foundation or if it needs to be cast aside. An analysis of the Outer Space Treaty reveals that it is too weak to adequately govern space and therefore needs to be replaced. This section will demonstrate that the Outer Space Treaty will inevitably fail: its problems cannot readily be fixed, and it may already be invalid.

106. 2006 Space Policy, *supra* note 8.

107. *Compare* Rumsfeld Commission, *supra* note 4 (arguing for prohibiting the use of space by other nations as a defensive tactic), *and* Presidential Commission, *supra* note 103 (encouraging the use of outer space for commercial activities), *with* Outer Space Treaty, *supra* note 7 (idealizing the use of outer space as an activity for the benefit of all mankind).

108. Park, *supra* note 7, at 879.

109. *Id.* at 25.

110. *Id.*

111. Lawrence L. Risley, *An Examination of the Need to Amend Space Law to Protect the Private Explorer in Outer Space*, 26 W. ST. U. L. REV. 47, 65 (1998–1999).

112. *Id.*

113. Twibell, *supra* note 20, at 592.

### A. THE OUTER SPACE TREATY IS DESTINED TO FAIL

The drafters of the Outer Space Treaty designated space as a commons, allowing any nation to use space without hindrance but forbidding all nations from claiming any of it as sovereign territory.[114] The natural fear with any commons is that it will lead to overuse.[115] To combat this, the "benefit of all mankind" language has been interpreted to require sharing of profits.[116] This interpretation, however, created an anti-commons problem where outer space is dramatically underused.[117]

Some commentators argue that absent the Outer Space Treaty the moon would have been colonized before the end of the Cold War.[118] If presence in space was continuous, then certain renewable resources of space would be more easily harnessed. The natural vacuum and absence of gravity in space aid in manufacturing semiconductors, microchips, pharmaceuticals, and aids crystal formation necessary in genetic engineering and molecular electronics.[119] Although technology has advanced on earth, the natural vacuum of space is still many times superior to that of our best terrestrial efforts.[120] Equally renewable is solar power which is approximately fifteen times more efficient when captured in space than on earth.[121] The cost to launch satellites capable of beaming solar energy is prohibitive,[122] but

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114. Husby, *supra* note 44, at 365.

115. Garret Hardin, *The Tragedy of the Commons*, SCIENCE, Dec. 13, 1968, at 1244. The quintessential commons is a pasture shared by many herders. Each herder has incentive to graze as many cattle as possible because the degradation of the pasture is born equally by all herders. In time, the pasture is worthless to all because each actor over used its resources. For outer space, the fear is that the economical resources will be consumed by the earliest actors, leaving nothing for later actors.

116. *See supra* Part I.B.1.

117. Michael Heller, *The Tragedy of the Anti-Commons*, 111 HARV. L. REV. 622, 624 (1998). An anti-commons, like a commons, is shared by many actors. Unlike a commons, rather than each actor having free use of the commons, an actor is required to gain the consent of all other actors before he can use the common area. The result is that transaction costs are so great that the common area is underutilized.

118. Brandon C. Gruner, *A New Hope for International Space Law*, 35 SETON HALL L. REV. 299, 318 (2004).

119. Twibell, *supra* note 20, at 626–27.

120. *Id.*

121. Rashmi Mayur, Ph.D., *Solar Power Satellite and Third World Energy Future* in SPACE MANUFACTURING 7: SPACE RESOURCES TO IMPROVE LIFE ON EARTH 159 (Barbara Faughnan & Gregg Maryniak eds., Nov. 1991). An average solar power satellite could provide 10 million kilowatts of power, or enough to power a metropolitan area of four million people. *Id.*

122. Twibell, *supra* note 20, at 634.

would not be if the satellites were created from materials mined in space.[123]

The ostensible goal of the Outer Space Treaty was to encourage the exploration of outer space "for the benefit of all peoples."[124] On this it was an abysmal failure.[125] In place of granting space to all mankind, the treaty restricted space *from* all mankind and stunted space exploration.[126] Because the treaty does not deliver its promised benefits, and because the fears that premised its creation are gone,[127] the treaty will eventually be rejected.

### B. THE PROBLEMS INHERENT IN THE OUTER SPACE TREATY CANNOT BE REMEDIED

Because the drafters of the Outer Space Treaty created ambiguities within the text that have been interpreted in various ways by various actors,[128] there is no consensus on what the Outer Space Treaty mandates. A division is typically drawn between space actors and non-space actors.[129] The scope of the treaty has been flawed since its inception, its weakness has made it irrelevant in modern space policies, and the treaty itself appears to be on the cusp of failure.

#### *1. The Treaty's Wide Breadth has Undermined its Strength*

The Outer Space Treaty allocates the entire universe to

123. *See id.* A solar power satellite would have a mass of 100,000 tons. Therefore, the costs of launching such a satellite would make it economically prohibitive for the foreseeable future. *Id.* (citing Gerard K. O'Neill, Keynote Address, in 68 PROCEEDINGS OF THE FOURTH ANNUAL L5 SPACE DEVELOPMENT CONFERENCE 18 (Frank Hecker ed., 1987)).

124. Outer Space Treaty, *supra* note 7, at ¶ 4. One commentator described the spirit of the Outer Space Treaty as one of the "first real attempts" to establish a global community that would ensure space would not be divided up "through conquest and colonialism." Heidi Keefe, *Making the Final Frontier Feasible: A Critical Look at the Current Body of Outer Space Law*, 11 SANTA CLARA COMPUTER & HIGH TECH. L.J. 345–46 (1995).

125. John Hickman, *Still Crazy After Four Decades: The Case for Withdrawing from the 1967 Outer Space Treaty*, SPACE REVIEW, Sept. 24, 2007, http://thespacereview.com/article/960/1.

126. "Within two years of the treaty's ratification, NASA's funding dropped 26%; four years later, financial support decreased by 45%; and funding for the space program was down 60% within six years." Gruner, *supra* note 118, at 315.

127. For a more detailed analysis of the Outer Space Treaty and Cold War fears, see *supra* Part I.A.

128. For a more detailed examination of these consequences, *see supra* Part I.A.

129. *See supra* note 128.

mankind.[130] No matter how far an actor travels, nothing in outer space can ever be discovered or claimed. In addition to covering all of space, most commentators agree that the non-appropriation clause is intended to apply to state and private actors alike.[131] There is less of a consensus on whether the non-appropriation clause is limited to celestial bodies or if it extends to minerals as well.[132] The debate extends back to the original on-the-record interpretations in which the space actors interpreted Article I of the Outer Space Treaty as meaningless.[133]

When the Outer Space Treaty was drafted the dominant view was that it barred all property rights, including those of private actors and patents.[134] That view has lost support over time as the changing international environment recognized the necessity to allow some property rights in space.[135] Regardless, the damage was done. The fact that property rights could dramatically change without the treaty text changing indicated one thing: uncertainty. Uncertainty is anathema to investment.

The Outer Space Treaty claims to apply to all actors through all of space.[136] Over time, however, the definitions of both actor and space have come under flux.[137] During this time,

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130. *See generally* Outer Space Treaty, *supra* note 7 (referring to outer space generally, making no limitation on where its application ends). To give this context, Voyager 1 was launched in 1977 and has traveled 100 times the distance from the Earth to the sun. Jet Propulsion Laboratory, California Institute of Technology, *Voyager 1: 'The Spacecraft That Could' Hits New Milestone* (Aug. 15, 2006), http://www.jpl.nasa.gov/news/features.cfm?feature=1150.

131. Article II of the Outer Space Treaty bans "national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." *See* Outer Space Treaty, *supra* note 7. It is the "any other means" language that was interpreted to keep states from appropriating celestial bodies through private actors acting on their behalf. Jonathan Thomas, *Privatization of Space Ventures: Proposing a Proven Regulatory Theory for Future Extraterrestrial Appropriation*, 1 INT'L L. & MGMT. REV. 191, 199–200 (2005). *Cf.* Sattler, *supra* note 78, at 28–29 (arguing that there is disagreement on whether the Outer Space Treaty prohibits property rights of private actors).

132. Sattler, *supra* note 78, at 28–29.

133. The "on-the-record" interpretations are discussed more fully in *supra* Part I.A.

134. Glenn H. Reynolds, *International Space Law: Into the Twenty-First Century*, 25 VAND. J. TRANSNAT'L L. 225, 230 (1992).

135. *Id.* Although the current dominant view is to allow some property rights in space, the lack of a clear set of laws is still a barrier to most actors. What rights are protected and what are not is still in debate and in flux.

136. Outer Space Treaty, *supra* note 7. *See supra* notes 130–133 and accompanying text.

137. *See supra* notes 134–136 and accompanying text.

domestic courts have been reluctant to make statements regarding outer space.[138] Although courts have been willing to extend jurisdiction of United States patent law to cover infringement aboard "American vessels on the high seas,"[139] they have been unwilling to extend that same principle to United States vessels in outer space.[140] Although the comparison is strikingly clear, courts have stated that they are awaiting a clear signal from Congress regarding extraterritorial applications of patent law.[141] Moreover, international courts have never enforced Article I against any nation.[142] The lack of faith in the Outer Space Treaty is as great as its purported breadth, making it an insufficient base to develop a substantive set of space laws.

### *2. The Outer Space Treaty is Irrelevant to Modern Space Policies*

In the four decades since the creation of the Outer Space Treaty, society has been guided by more corporate incentives than governmental mandates.[143] Exploration of outer space is prohibitively expensive,[144] requiring certainty and stability to encourage investment.[145] Because space actors have relied on differing interpretation of the Outer Space Treaty depending on their interests,[146] there now exists decades of space policy that would have to be changed if the treaty was to regain relevance. This is likely too high a hurdle to cross.

In 2006 the United States updated its space policy for the

138. Twibell, *supra* note 20, at 617–18.

139. Gardiner v. Howe, 9 F. Cas. 1157 (C.C.D.Mass. 1865).

140. Twibell, *supra* note 20, at 617–18.

141. Ocean Science & Eng'g, Inc. v. United States, 595 F.2d 572 (Ct. Cl. 1979).

142. Husby, *supra* note 44, at 364.

143. Thomas, *supra* note 131, at 206.

144. It is estimated that by 2010 the United States alone will have invested $600 billion in space, comparable to the total current U.S. investment in Europe. *See* Park, *supra* note 7, at 879. The 2006 Space Policy also acknowledges that space technology requires lengthy research and development time. Therefore, the policy seeks to promote research to "ensure that space capabilities are available in time to further U.S. national security, homeland security, and foreign policy objectives . . . ." 2006 Space Policy, *supra* note 8.

145. Jiru, *supra* note 46, at 171. Although this section primarily focuses on the need to provide stability for private actors, it is worth noting that state actors act similarly. As mentioned in note 126, *supra*, the United States' investment in space dropped dramatically once the risk of the Soviet Union was removed.

146. For a more detailed discussion of these interpretations *see supra* Part I.A.

first time in more than a decade.[147] The 2006 Space Policy brought many of the modern assumptions about the Outer Space Treaty under the official auspices of national policy.[148] The policy also showcased the United States' continued departure from the idealistic intentions originally embodied in the Outer Space Treaty.[149] In interpreting the "peaceful purposes" language of Article IV,[150] the United States mandated as one of its core principles to "take those actions necessary to protect [the United States'] space capabilities; . . . and deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests."[151] The 2006 Space Policy also addresses the goal of "[d]evelop[ing] and deploy[ing] space capabilities that sustain U.S. advantage."[152]

The United States justified its 2006 Space Policy on grounds that space has become a critical component of its economy[153] and national security.[154] The United Nations Charter recognizes that self-defense is an inherent right of all states.[155] It is undisputed that a critical component of United States self-

147. *See* 2006 Space Policy, *supra* note 8. The space policy supersedes the Presidential Decision Directive/NSC-49/NSTC-8, National Space Policy, dated Sept. 14, 1996.

148. The 2006 Space Policy acknowledges the right to weaponize space to defend space capabilities, the right to privately benefit from space, and seeks to foster a commercialized space sector. *Id.* In doing so, the 2006 Space Policy abrogates any reading of the Outer Space Treaty that restricts all property rights, demands equitable distribution of the benefits of space, and prohibits the weaponization of space under any pretense.

149. *Id.*

150. Article IV of the Outer Space Treaty says in pertinent part: "The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes . . . . [T]he testing of any type of weapons . . . on celestial bodies shall be forbidden." *See* Outer Space Treaty, *supra* note 7.

151. 2006 Space Policy, *supra* note 8. The Space Policy goes on to state that any "proposed arms control agreements must not impair the rights of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests." A natural reading of the Space Policy shows the United States reserving the right to weaponize space if doing so is consistent with U.S. national interests. Given that one of the national interests the U.S. asserts is being able to defend its own interests in space, a circular argument exists that endows the U.S. with the ability to weaponize space as a precaution for space being weaponized. *See infra* note 167 and accompanying text.

152. 2006 Space Policy, *supra* note 8.

153. *See supra* note 16 and accompanying text.

154. 2006 Space Policy, *supra* note 8. The 2006 Space Policy states that the United States "is critically dependent upon space capabilities, and this dependence will grow." *Id.*

155. U.N. Charter art. 51.

defense is dependent on "space force enhancements."[156] The United States has interpreted self-defense as including not only defense of a nation's people, but defense of a nation's property.[157] Under the 2006 Space Policy, a threat on United States' space assets could justifiably result in the weaponization of space.[158] It seems improbable that a policy with the stated goals of sustaining an advantage in space and "denying similar capabilities to others" is compatible with the Outer Space Treaty and reserving space for the benefit of all peoples.[159]

### *3. The Outer Space Treaty is on the Cusp of Failing*

The increasing dependence on space for self-defense has naturally brought the fear of weaponization of space to the forefront of the debate.[160] The modern understanding of "peaceful" is "non-aggressive," as permitted under Article 2(4) of the United Nations Charter.[161] Consequently, space has already been weaponized in so much as it is crucial to the military

156. *See* Park, *supra* note 7, at 892 (noting that without "space force enhancements" the U.S. military power would be crippled). The phrase "space force enhancements" refer to satellites which provide communications, reconnaissance, navigation, and missile launch warning. *See id.* at 895 ("[T]he United States is more dependent on space technology for its security and economic well-being than any other nation.") (citing Report of The Commission to Assess United States National Security Space Management and Organization: S. Hrg. 18 Before the Subcomm. on Strategic Forces of the S. Comm. on Armed Services 117th Cong. 154 (2001)).

157. *See* Park, *supra* note 7, at 893–96 (citing the increased use of the United States on the self-defense argument to justify its stance on the defensive weaponization of outer space). While this section refers only to the United States, many other nations rely heavily on outer space for military, communications, and economics as well. The United States, however, acts as a useful litmus test because its participation in a treaty often signals its success or failure.

158. The argument logically follows from three premises: an inherent right to self-defense, *see supra* note 155 and accompanying text; an understanding of self-defense as including property of private actors sovereign to the nation, *see supra* note 157 and accompanying text; and, finally, an understanding that the right to self-defense includes a right to preventative action, *see supra* note 151 and accompanying text.

159. *Compare* 2006 Space Policy, *supra* note 8 (arguing for precluding other nations from space), *with* Outer Space Treaty, *supra* note 7 (arguing that outer space is for the benefit of all mankind).

160. *See generally* Park, *supra* note 7, at 881.

161. *Id.* at 883–84. The United States was the first to propose that outer space be used exclusively for peaceful purposes. President Dwight D. Eisenhower and U.N. Ambassador Henry Cabot Lodge, 36 Dep't of State Bulletin 124, 227 (1957). However, the United States was also the first to point out that the term peaceful allows for "non-aggressive" space militarization. *See* Park, *supra* note 7, at 884 (citing ABRAM CHAYES ET AL., SPACE WEAPONS: THE LEGAL CONTEXT, IN WEAPONS IN SPACE 193, 196–97 (Franklin A. Long et al. eds., 1986)).

operations of all developed nations.[162] As the United States moves forward with its 2006 Space Policy, space will be further weaponized, not only by military satellites, but by destructive weapons, leaving other countries no choice but to follow in step.[163]

While no state wants to be the first to openly weaponize space, many are investing in dual-use technology.[164] Dual-use technologies are weapons designed for defensive action, and therefore considered "peaceful," but retain potent offensive capabilities.[165] Because there is no current bar against dual-use weapons, their placement in orbit will have the effect of weaponizing space.[166]

The weaponization of space is inevitable because it is in every nation's best interest to weaponize space. This scenario is a classic prisoner's dilemma.[167] No matter what action is taken by other nations, every single nation is enticed by the benefit of being the first to weaponize space.[168] Although non-armament treaties can rectify the situation somewhat,[169] they are not a long-term solution because the incentive to defect will always remain.[170] Finally, the 2006 Space Policy also expressly

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162. *See supra* notes 156–157.

163. *See* Park, *supra* note 7, at 898–900.

164. Similar to during the Cold War, all nations fear that whoever is the first to weaponize space will turn public opinion against them. *See supra* Part I.A.

165. Park, *supra* note 7, at 884–85 (noting the most prominent dual-use weapon is space based lasers designed to destroy hostile ballistic missiles, but capable of targeting defensive and non-hostile objects).

166. As argued above, any argument that space is not already weaponized is purely academic. It is crucial to all manner of modern warfare, both offensive and defensive, and terrestrial missile systems have been developed to target space satellites. *See supra* notes 12 & 156–157 and accompanying text. Space is not peaceful, but placement of dual-use weapons will make it decidedly less peaceful.

167. In a Prisoner's Dilemma scenario the optimal result is obtained when both sides cooperate. However, there is an incentive for each side to defect. When both sides defect, the worst scenario is obtained. Although defection harms each actor, the rational action is to defect because no matter the other actor does, you are better-off by defection. Robert Aumann, *Acceptable points in general cooperative n-person games*, *in* 4 CONTRIBUTIONS TO THE THEORY OF GAMES, ANNALS OF MATHEMATICS STUDY 40, pp. 287–324 (R. D. Luce & A. W. Tucker, eds. 1959).

168. In the case of weaponizing space, each side is best served if no one weaponizes space. But a nation has an incentive to defect and weaponize space to become the dominant space actor. When both sides inevitably defect, the result is a space war where all actors lose. *Id.*

169. In a Prisoner's Dilemma scenario a treaty is a called a reciprocity constraint. It requires both actors to take the same action. *Id.*

170. The incentive to defect will never dissipate and once any actor defects all actors must follow. *See supra* note 164 and accompanying text. Similarly, given the number of space actors, it is unlikely that all will agree to be bound by a single

prohibits agreeing to arms control restrictions that impair United States objectives.[171]

Given the inevitability of the weaponization of space,[172] it behooves every nation to weaponize as soon as possible to "stay ahead of the curve."[173] Even if a nation chooses not to aggressively restrict other nations from weaponizing space, it would be ensuring it could not be similarly exploited.[174] It is also in the best interests of every nation for a measured introduction of weapons to space by opposing nations at approximately the same time. The alternative would be a sudden discovery that one nation had secretly weaponized space.[175] The former is likely to create an international tension while the later is likely to spark a new Cold War.[176]

Any interpretation of the Outer Space Treaty that attempts to bind the hands of the United States to keep weapons out of space will be rejected as harshly as the Moon Treaty.[177] Coupling this weakness with the absence of an international court to adjudicate conflicts means that the first time the Outer Space Treaty is tested, it will become apparent that it has no teeth.[178] Although this is problematic because countries could simply refuse to cooperate in settling conflicts, the absence of procedure is even more worrisome.[179] With no agreed upon procedure, discovery alone could grind proceedings to a halt as

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treaty.

171. 2006 Space Policy, *supra* note 8.

172. There is a strong rebuttal to the inevitability argument that weaponization of space is only inevitable because nations consider it inevitable. Nations have made it a self-fulfilling prophecy out of fear. While the point is noted, given the current hostilities in the world, the failing of similar treaties such as the Nuclear Proliferation Treaty, and the fact that only one nation need weaponize space for it to be weaponized, the inevitability argument is the probable outcome. *See* Park, *supra* note 7, at 888–89.

173. *Id.* at 886.

174. *See id.* at 890 (citing that the United States may weaponize space purely as a security measure to protect their dependence on space).

175. Such an event would be very reminiscent of the launch of Sputnik that triggered the space race. In the aftermath of Sputnik, the world community rushed to ease its collective fears by adopting a body of space law that proved ill suited to its actual needs. While Sputnik proved to be rather benign, a similar mistake with something as volatile as the weaponization of space could trigger a new Cold War or worse. *See supra* Part I.A.

176. The Rumsfeld Commission, *supra* note 4, at viii, warned of a "Space Pearl Harbor" if the United States did not prepare to defend its space assets.

177. The rejection of the Moon Treaty is discussed more fully *supra* Part I.B.3.

178. Jason Haile, *The New Age of Conquest and Colonialism: How Admiralty Will be Used on the Final Frontier*, 29 TUL. MAR. L.J. 353, 360 (2005).

179. *Id.*

each nation attempts to use its own rules of dispositions, service, production of documents, etc.[180] The Outer Space Treaty is propped up on so little that it should be examined before further action destroys its already eroding foundation.

### C. THE OUTER SPACE TREATY MAY ALREADY BE INVALID

While the Outer Space Treaty allows signatories to withdraw on one year's notice,[181] the Treaty itself may actually be invalid under the Vienna Convention on the Law of Treaties.[182] The Treaty Convention recognizes that states ought not to be held by a treaty when there has been a fundamental change in circumstances.[183] A fundamental change is defined as a shift in an expectation closely linked to the purpose of the treaty that was not foreseen by the parties.[184] While international tribunals have been strict in finding a fundamental change of circumstances,[185] the Outer Space Treaty would likely be found to have undergone a fundamental change because of the circumstances surrounding its creation,[186] the changes in its interpretation,[187] and because the usage of outer space today is a far cry from what was planned for in the 1960s.[188] "While . . . space activities have grown exponentially," space law has remained stagnant.[189]

## III. DERIVING PRINCIPLES FOR A STRONGER SPACE LAW

The principles of "*Qui prior est tempore potior est jure*"[190]

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180. *Id.*

181. Outer Space Treaty, *supra* note 7, art. XVI.

182. Thomas, *supra* note 131, at 213. *See generally* Vienna Convention on the Law of Treaties, opened for signature May 23, 1969, art. 31, 1195 U.N.T.S. 331, 8 I.L.M. 679 [hereinafter Treaty Convention].

183. Treaty Convention, *supra* note 182, art. 62.

184. *Id.*

185. Thomas, *supra* note 131, at 213–14 (discussing the Gabcikovo-Nagymaros Project where despite environmental concerns and diminishing economic viability a treaty was held to be valid).

186. The circumstances surrounding the creation of the Outer Space Treaty are described more fully *supra* Part I.B.

187. The changes in interpretation of space law is discussed more fully in *supra* Part II.B.1.

188. Haile, *supra* note 178, at 358.

189. *Id.*

190. "Who is first in point of time is stronger in right." Thomas, *supra* note 131, at 220.

have been a guiding tenet of property law for thousands of years.[191] While some commentators argue that this model is the best for encouraging space exploration,[192] it does not satisfy the longstanding fears of non-space actors that space will be entirely appropriated before they ever leave Earth.[193] While the international community has dealt with "commons" problems before, outer space presents a commons that is virtually inaccessible to a majority of the world while offering great rewards to an elite few.[194] An examination of these treaties reveals not only their strengths and weaknesses, but why they succeeded or failed. The result is a list of principles that an effective space law must have. They are (a) wide international acceptance; (b) incentives for state and private actors to use outer space; and, (c) flexibility to adapt to changes in the international community.

### A. WIDE INTERNATIONAL ACCEPTANCE

Treaties have only gained wide international acceptance when the benefits they offered were universally desirable.[195] Every treaty examined in this Note that placed greater obligations on an actor than benefits conferred was rejected.[196] While the simple answer is for space law to limit its restrictive provisions to aspects that harm all nations equally,[197] nations

191. *Id.*

192. *Id.* at 220–22.

193. For a more detailed discussion on these fears *see supra* Part I.A.

194. For a more detailed discussion on the rewards of outer space *see supra* Part I.D.

195. The Outer Space Treaty ameliorated fears born by every nation. *Cf supra* Part I.A. (detailing the international climate at the creation of the Outer Space Treaty and Cold War fears). The expansionary treaties offered benefits exactly reciprocal to the obligations they imposed. *See supra* Part I.B.2. The Convention on the High Seas ensured that every nation would have access to the high seas without having to defend its right. *See supra* Part I.C.

196. The Moon Treaty was heavily rejected because it offered little to no protection to space actors. *See supra* Part I.B.3. The International Seabed Authority was rejected by developed nations who did not want to abrogate their rights to mine the seabed. *See supra* Part I.C. The Antarctic Treaty System's efforts to regulate Antarctic mining fared similarly. *See supra* note 82.

197. Nations have typically regarded harm to the environment, waste of resources, and impediments to their own lawful use as valid reciprocal harms. *See supra* Part I.C. In addition, nations have viewed rescue agreements, accident payment provisions, and subjection to an independent tribunal as reciprocal benefits. *Consider supra* Part I.B.2. The United States has frequently refused to subject itself to the jurisdiction or other tribunals. The United States acknowledges the World Court as a purely advisory body and in 2002 withdrew itself as a

have been willing to surrender rights for social or political benefits. For example, in October 2007 the United States Senate Foreign Relations Committee opened debate on whether or not to ratify the United Nations Convention on the Law of the Sea.[198] It was argued that ratifying the Convention would gain the United States a veto power against future changes.[199] Although ratifying the Convention would supersede the Seabed Act and limit the United States' deep seabed mining privileges, the veto power would allow the United States to regulate other provisions of the Convention that limit the U.S. Navy.[200]

### B. INCENTIVES FOR STATE AND PRIVATE ACTORS

Absolutely crucial to the use of any resource is a motivation to use it.[201] The need for motivation increases along with the risk and capital needed to harness the resource.[202] Fortunately, space offers near limitless rewards for those who can harness it as a resource.[203] Space law must therefore readily encourage the use of space if these laws are to be successful.

The Convention on the High Seas allowed for any nation to use international waters, but also allowed nations to claim sovereignty over islands found in those waters.[204] In this manner it encouraged the use of the high seas not only for travel and trade, but also for exploration. As entrepreneurs attempted to make better use of the seas they made incidental discoveries

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signatory from the 1998 Rome Statute to establish an International Criminal Court which would subject U.S. soldiers to its jurisdiction. The Bush Administration went so far as to promote passage of the American Servicemen's Protection Act (ASPA), which prohibits U.S. cooperation with the Court and even restricts U.S. military aid to countries that refuse to sign an agreement pledging to shield U.S. troops on their territory from ICC prosecution. The U.N. Convention on the Law of the Sea, Hearing before the Senate Committee on Foreign Relation, 110th Cong., 1st Sess. (Oct. 4, 2007) (opening statement of Senator Richard G. Lugar), *available at* http://www.senate.gov/~foreign/testimony/2007/LugarStatement071004.pdf.

198. The U.N. Convention on the Law of the Sea, Hearing before the Senate Committee on Foreign Relation, 108th Cong., 1st Sess. (Oct. 14, 2003), *available at* http://www.senate.gov/~foreign/testimony/2003/LugarStatement031014.pdf.

199. The U.N. Convention on the Law of the Sea, Hearing before the Senate Committee on Foreign Relation, 108th Cong., 1st Sess. (Oct. 14, 2003) (opening statement of Senator Richard G. Lugar), *available at* http://www.senate.gov/~foreign/testimony/2003/LugarStatement031014.pdf.

200. *Id.*

201. Twibell, *supra* note 20, at 616.

202. *Id.*

203. *See supra* note 112 and accompanying text.

204. The Convention on the High Seas deals exclusively with the high seas. *See supra* Part I.C.

that benefited all of mankind.[205] The more pronounced a presence there is in space, the more incidental discoveries are likely to be found. Humanity's short presence in space has already led to developments in medicine and electronics which have the potential to help the masses.[206]

The Seabed Act also encourages use of resources while being less generous than free appropriation.[207] The Act encourages investment by creating a presumption that a permit will be allowed so long as a basic showing is made.[208] However, the Act still allows the government to retain control of when and where mining occurs.[209] More importantly, the Seabed Act requires permit holders to make commercially viable use of the mining area or forfeit the permit.[210] This encourages active use of resources and alleviates the fears that nations with the most technological advantage will appropriate all of the economical resources. The Seabed Act demonstrates that actors only need incentives, not bribes, to exploit resources. Space law does not have to offer the light side of the moon to spur actors to act.

The argument should be tempered by noting that the fears of non-space actors are not completely ameliorated because space actors actually will develop the *most* economical resources, forcing non-space actors to travel farther or develop less economical resources. This is a flimsy argument. First, no one advocates *never* using the resources of outer space.[211] The argument is over the equitable distribution of the benefits.[212] Because an equitable distribution means space will never be exploited, most commentators ignore this reading of the Outer Space Treaty.[213] The only remaining reading would be to preserve outer space resources until all nations can equitably exploit them individually and equally. Because it is unlikely that there will ever be a moment when all nations have an equal

205. Thomas, *supra* note 131, at 219–22 (citing the discovery of the Americas as a result of exploration).

206. Twibell, *supra* note 20, at 626–27.

207. *See supra* Part I.C.

208. 30 U.S.C. § 1413(a)(2)(D) (2000).

209. The issuing of permits gives the government considerable latitude, including the ability to deny a permit on grounds that it threatens the environment (30 U.S.C. § 1413(a)(2)(D)(ii) (2000)), or threatens other lawful uses of the High Seas by other nations (30 U.S.C. § 1421) (2000).

210. *See supra* note 100 and accompanying text.

211. The very language of "for the benefit of all peoples" intimates that some benefit is eventually intended to result. Outer Space Treaty, *supra* note 7, ¶ 4.

212. These arguments are developed more fully in *supra* Part I.B.

213. Thomas, *supra* note 131, at 200.

foothold in outer space, if this latter reading were true, at some point the international community would have to agree to dissolve the Outer Space Treaty. Under that interpretation, it seems that non-space actors are just trying to "buy time" until they can get into space.

Second, outer space is immense.[214] Any fear that the "good resources" will be used up is circumspect at best. For example, in 2004 the world production of iron exceeded one-billion metric tons for the first time ever.[215] A typical asteroid one kilometer in diameter contains two to three times that much iron ore.[216] Current estimates place between 1.1 and 1.9 million asteroids of that size in our solar system.[217]

### C. FLEXIBILITY TO ADAPT TO CHANGES IN THE INTERNATIONAL COMMUNITY

Space exploration has existed for less than fifty years and so it is presumptuous to assume that the laws created today will remain useful in the next decade, much less the next century.[218] Space law ought to create a framework in which to operate rather than a stable set of laws. Central to a strong framework will be a strong governing body to resolve disputes.[219] A governing body can also distribute and review permits on an equal footing, ensuring that the benefits of space are equitably distributed to those parties best suited.[220] More importantly, by only issuing permits the regulatory body can shift resources toward their best and highest use as technology develops and other actors or uses become more efficient for a segment of space.[221]

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214. *See supra* note 130 and accompanying text.

215. International Iron and Steel Institute, 2005, *World Produces 1.05 Billion Tonnes of Steel in 2004*, NEW MATERIALS INTERNATIONAL, Jan. 19, 2005, http://www.newmaterials.com/news/833.asp.

216. JOHN S. LEWIS, MINING THE SKY: UNTOLD RICHES FROM THE ASTEROIDS, COMETS, AND PLANETS (1997).

217. Press Release, European Space Agency, New Study Reveals Twice as Many Asteroids as Previously Believed (Apr. 4, 2002) http://www.spaceref.com/news/viewpr.html?pid=7925. *See supra* note 111 and accompanying text.

218. The Moon Treaty is the quintessential example of a shift in the needs of the international community. Just twelve years after the wide ratification of the Outer Space Treaty, the Moon Treaty was even more widely rejected. *See supra* Part I.B.3.

219. Haile, *supra* note 178, at 360. Space is an expensive place and the absence of a regulatory body capable of resolving disputes is a disincentive to invest large sums of money in outer space. *Id.*

220. *See supra* Part III.B.

221. *See generally* Seabed Act, *supra* note 95.

## D. A MODERN EXAMPLE IN THE INTERNATIONAL TELECOMMUNICATIONS UNION

The International Telecommunications Union (ITU) is an agency of the United Nations that oversees geostationary orbital slots for satellites.[222] Because there are a limited number of orbital slots they are highly demanded and therefore must be regulated. The ITU regulates orbital slots under an *a priori* and an *a posteriori* system.[223] Under the *a posteriori* system the maxim of "first in time, first in right" awards slots as the need arises and is demonstrated.[224] Not surprisingly, space actors prefer this method.[225] The *a priori* system awards slots to each nation, regardless of whether the slots are needed.[226] Again, non-space actors prefer the latter system because it reserves orbital slots for their eventual entrance to space.[227]

The ITU requires that the "majority of slots applied for must be used directly by the countries requesting the slots" due in part to the sale of orbital slots.[228] The Pacific Island nation of Tonga registered for a number of geostationary orbital slots with which it leased one and auctioned five more for $2 million per year for each slot.[229] The ITU has since stated that it will distribute slots to "those who provide the most efficient use of the resource," reasoning that to do otherwise would waste resources.[230]

Because of its great flexibility in determining who gets which slot and the ability to alter those decisions as the situation changes, the ITU has many of the same strengths as the United States Seabed Act.[231] Regrettably, the ITU

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222. Geostationary orbit slots refer to the band of space directly above the equator and are likely "the most valuable of all space resources to date." Buxton, *supra* note 83, at 703 (quoting Ezra J. Reinstein, *Owning Outer Space*, 20 NW. J. INT'L L. & BUS. 59, 64 (1999)). Satellites in these slots travel at the same speed as the earth, allowing the satellite to cover a continuous area on earth. *Id.* "[A] satellite in geostationary orbit encompasses a field of view of 42% of the earth's land surface." *Id.*

223. Susan Cahill, *Give Me My Space: Implications for Permitting National Appropriation of the Geostationary Orbit*, 19 WIS. INT'L L.J. 231, 238 (2001).

224. Buxton, *supra* note 83, at 703–04.

225. *Id.*

226. Cahill, *supra* note 223, at 238.

227. Buxton, *supra* note 83, at 703–04.

228. *Id.*

229. *Id.* Tonga originally applied for 16 orbital slots but reduced this number to six because of international pressure. *Id.*

230. *Id.*

231. *See supra* Parts I.C. & III.C.

circumvented perhaps its greatest strength when it stopped the sale of orbital slots.[232] Some commentators suggest the impetus for the decision was that allowing orbital slots to be sold reflected an acknowledgement of a space property right.[233] In distributing orbital slots to all nations and then allowing them to be auctioned, non-space actors would be benefiting from space while preserving the orbital slot for their eventual entrance to space.[234] The benefits of space would be distributed to all of mankind as space actors are given incentive and reward for exploration and non-space actors are paid for access to their property.

## CONCLUSION

The twenty-first century has brought a new set of fears to the ongoing space race. Fears of national security and economic turmoil have brought the world's eyes back to outer space as the hope for the future. The current body of space law still looks to old fears, and so inadequately addresses the needs of the international community. As nations continue to test the boundaries of the Outer Space Treaty, it is becoming ever more clear that it has little strength to guide or control space actors. Space is becoming dangerously close to outright weaponization, and when it does there will be no guides to navigate through the uncharted dangers. A new body of space law is required; one that can recognize changes as rapidly as they arise. Fortunately, the international community can draw upon their successes in the past to create a dynamic and powerful body of space law that can react to the needs of the twenty-first century and beyond.

232. *See* Buxton, *supra* note 83, at 703–04.

233. *Id.*

234. In essence, the ITU could have granted a permit similar to those proposed, *supra* Part III.C., allowing a market for space to form naturally. As more and more nations began using their orbital slots, the demand for orbital slots would rise, causing a corresponding increase in price, and providing an even greater benefit for late-arriving space actors.