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RULING OUTER SPACE: DEFINING THE BOUNDARY AND DETERMINING JURISDICTIONAL AUTHORITY

ALEX S. LI*

“If some acts be examinable, and others not, there must be some rule of law to guide . . . the exercise of . . . jurisdiction.”¹ These words in *Marbury v. Madison* laid the groundwork for a bedrock legal principle: judicial review.² Written by Chief Justice John Marshall in 1803, *Marbury v. Madison* has stood the test of time.³ The concept it espoused has empowered countless American courts to legitimately assert their authorities and interpretations of law on a wide range of issues. But, in establishing the judiciary’s authority to interpret the law, *Marbury v. Madison* has also defined the contours and limitations of such authority.⁴ For a court to issue a valid and enforceable judgment, the opinion dictates that such court must have valid jurisdiction over the issue at hand. Without such jurisdiction, “its judgments and orders are regarded as nullities. They are not voidable, but simply void They constitute no justification; and all persons concerned in executing such judgments, or sentences, are considered, in law, as trespassers.”⁵

Worldwide, the jurisprudence regarding jurisdictional authority has undergone continual refinement throughout the years. Complex and uncertain, jurisdictional issues involving parties of different nationalities and disputes rooted in

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1. *Marbury v. Madison*, 5 U.S. (1 Cranch) 137, 165 (1803).
2. See Michael J. Gerhardt, *Super Precedent*, 90 MINN. L. REV. 1204, 1207–08 (2006).
3. See Frank B. Cross & James F. Spriggs II, *The Most Important (and Best) Supreme Court Opinions and Justices*, 60 EMORY L.J. 407, 423 n.73 (2010) (stating that *Marbury* has been cited “over 17,000” times—the “fourth most citations of any case in Supreme Court history”).
4. See *Marbury*, 5 U.S. (1 Cranch) at 174–75 (noting that the Supreme Court has original jurisdiction for only certain types of cases).
5. *Elliott v. Piersol*, 26 U.S. (1 Pet.) 328, 329 (1828).

international territories are often the subject of intense litigation.⁶ However, with globalization only increasing, many legal professionals, scholars, and politicians have attempted to develop comprehensive legal regimes that can efficiently and effectively resolve these multinational disputes.⁷ While the rise of many different types of rules and regulations can cause confusion and complexity, it is still a well-developed area of international law; experienced and astute legal practitioners can identify common threads across different procedural regimes to streamline complex disputes.⁸

Yet, there is a vast and uncharted international territory where jurisdictional laws still remain largely unsettled: Outer Space. A mechanism for determining governing authority has not been a pressing concern in this sector—Outer Space has generally been the exclusive realm of governmental agencies. In fact, through early 2021, only three countries have crewed launch capabilities.⁹ But, a tectonic shift has recently been underway as Outer Space is rapidly being transformed into a new playground for commercial activities.¹⁰ With this territory becoming packed with satellites and spacecrafts originating from more nations and companies than ever before,¹¹ major disputes are likely unavoidable. To wit, in the summer of 2019, the *New York Times* reported the first ever accusation of

6. Hélène van Lith, *International Jurisdiction and Commercial Litigation: Uniform Rules for Contract Disputes 4* (June 19, 2009) (Ph.D. dissertation, Erasmus Universiteit Rotterdam) (T.M.C. Asser Press), <https://core.ac.uk/download/pdf/18507043.pdf>.

7. See Andrea Kupfer Schneider, *Getting Along: The Evolution of Dispute Resolution Regimes in International Trade Organizations*, 20 MICH. J. INT'L L. 697, 702 (1999) (“These events have spurred and accompanied the evolution of a variety of different dispute resolution regimes.”).

8. *Id.* (noting that common themes exist in different international dispute resolution regimes).

9. See Sam McNeil, *China Prepping for Mission to Bring Back Material from Moon*, PHYS.ORG (Nov. 23, 2020), <https://phys.org/news/2020-11-china-latest-lunar-mission.html> (observing that only the United States, Russia, and China have crewed launch capabilities).

10. See Michael Sheetz, *An Investor's Guide to Space, Wall Street's Next Trillion-Dollar Industry*, CNBC (Dec. 13, 2019, 11:33 AM EST), <https://www.cnbc.com/2019/11/09/how-to-invest-in-space-companies-complete-guide-to-rockets-satellites-and-more.html> (indicating that Outer Space “will become a multitrillion-dollar economy in the next 10 to 20 years”); see also Michael Sheetz, *The Most Expensive Hotel Ever? Here's the Cost for a Night at the International Space Station in 2020*, CNBC (Nov. 14, 2019, 7:29 PM EST), <https://www.cnbc.com/2019/06/07/nasa-opening-iss-to-business-including-private-astronauts-by-2020.html> (noting that the National Aeronautics and Space Administration will open up the International Space Station for space tourism).

11. See Michael Sheetz & Magdalena Petrova, *Why in the Next Decade Companies Will Launch Thousands More Satellites than in All of History*, CNBC (Dec. 15, 2019, 9:01 AM EST), <https://www.cnbc.com/2019/12/14/spacex-oneweb-and-amazon-to-launch-thousands-more-satellites-in-2020s.html>.

criminal activity in Outer Space after astronaut Anne McClain allegedly illegally accessed her spouse's bank account onboard the International Space Station.¹² While Ms. McClain was eventually cleared of all wrongdoing,¹³ this dispute raised a novel issue related to jurisdictional power: which country should have the right to investigate and resolve a particular conflict in Outer Space?¹⁴ While the jurisdictional authority for this particular controversy is fairly straightforward,¹⁵ for future disputes in Outer Space, the answer might be less clear cut. Hence, a renewed focus on establishing a flexible framework to determine jurisdictional authority is more relevant than ever before.

Yet, before this jurisdictional framework can be established, there is an even more fundamental question that needs to be addressed: where does Outer Space begin? Although certain countries have officially recognized an altitude of 100 kilometers above mean sea level as the beginning of Outer Space, there is no universally accepted boundary.¹⁶ While there have been numerous undertakings to create such an Outer Space border, "a lack of political will to negotiate and agree on a boundary at the international level" has stymied any effort.¹⁷ But, Outer Space is becoming increasingly crowded; thus, this status quo is becoming increasingly untenable, and a firm demarcation is needed.

To contribute to these areas of unsettled law, this Article proposes a new boundary for Outer Space and constructs a decision-tree framework for determining jurisdictional authority in this environment. Part I provides an overview of the major international treaties governing activities in Outer Space and a discussion of their relevant sections related to jurisdictional laws. Part II

12. Mike Baker, *NASA Astronaut Anne McClain Accused by Spouse of Crime in Space*, N.Y. TIMES (Aug. 27, 2020), <https://www.nytimes.com/2019/08/23/us/nasa-astronaut-anne-mcclain.html> [hereinafter Baker, *Crime in Space*].

13. Mike Baker, *Space Crime Allegation Leads to Charges Against Astronaut's Ex-Wife*, N.Y. TIMES (Apr. 6, 2020), <https://www.nytimes.com/2020/04/06/us/space-crime-allegation-indictment.html>.

14. Baker, *Crime in Space*, *supra* note 12.

15. See Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, art. 22, Jan. 29, 1998, State Dep't No. 01-52, 2001 WL 679938 ("[A country] may exercise criminal jurisdiction over personnel in or on any flight element who are their respective nationals.").

16. Comm. on the Peaceful Uses of Outer Space, Legal Subcomm., 56th Session, Matters Relating to the Definition and Delimitation of Outer Space: Replies of the International Institute of Space Law (IISL), at 1, U.N. Doc. A/AC.105/C.2/2017/CRP.29 (Apr. 4, 2017) [hereinafter IISL Replies].

17. *Id.*

outlines the current perspectives on the demarcation for Outer Space and proposes a new boundary that can garner international support. Part III lays out a framework that can determine which authority should have jurisdiction over a specific dispute. Part IV battle tests such jurisdictional decision tree by walking several hypothetical incidents through the analysis. With these proposals, this Article aims to spur action that will strengthen the legal foundation that governs Outer Space activities. Hopefully, these clarities in the law will help to unleash a new golden era of exploration leading to more innovations in humanity's final frontier.

I. Background: Treaties Governing Activities in Outer Space

Since Sputnik 1's fateful launch on October 4, 1957,¹⁸ human activities in Outer Space have continued unabatedly. As this environment became crowded with both unmanned satellites and manned capsules, the international community recognized the need for a basic legal framework to govern such activities—thereby guaranteeing the availability of Outer Space for all nations. Attempting to achieve this goal, five major international agreements were drafted. They are commonly referred to as the “five United Nations treaties on outer space”¹⁹ and have laid the seminal foundation for doctrinal law in this sector. Therefore, it is helpful to provide an overview on these treaties before proposing a demarcation line for Outer Space and a jurisdictional framework for this territory. In chronological order, the five treaties are:

1. *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*,²⁰ commonly known as the Outer Space Treaty of 1967;
2. *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*,²¹ commonly known as the Rescue Agreement of 1968;

18. Mark Wade, *Sputnik 1*, ENCYCLOPEDIA ASTRONAUTICA, <http://www.astronautix.com/s/sputnik1.html> (last visited Feb. 25, 2021).

19. *Space Law Treaties and Principles*, U.N. OFF. FOR OUTER SPACE AFFS., <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html> (last visited Feb. 25, 2021).

20. *opened for signature* Jan. 27, 1967, 18 U.S.T. 2410 [hereinafter Outer Space Treaty].

21. *opened for signature* Apr. 22, 1968, 19 U.S.T. 7570 [hereinafter Rescue Agreement].

3. *Convention on International Liability for Damage Caused by Space Objects*,²² commonly known as the Space Liability Convention of 1972;
4. *Convention on Registration of Objects Launched into Outer Space*,²³ commonly known as the Registration Convention of 1975; and
5. *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*,²⁴ commonly known as the Moon Treaty of 1979.

Of these five treaties, four have been ratified—all except for the Moon Treaty of 1979. But all five agreements have significantly contributed to the establishment of a broad legal structure governing Outer Space activities.

A. *Outer Space Treaty of 1967*

The Outer Space Treaty is the *sine qua non* foundation of Outer Space legal doctrine.²⁵ This treaty was negotiated primarily between the United States and the Soviet Union at the height of the Cold War. While these two leading nations of the time were on the opposite sides of the first Space Race, both had recognized the dangers and catastrophic effects of a potential war in Outer Space.²⁶ Hence, the treaty was drafted with the primary goal of ensuring that only peaceful activities shall take place in Outer Space.²⁷ This enables the environment to “be free for exploration and use by all States without discrimination of any kind” and grants “free access to all areas of celestial bodies.”²⁸ While the premise has led to

22. *opened for signature* Mar. 29, 1972, 24 U.S.T. 2389 [hereinafter Space Liability Convention].

23. *opened for signature* Jan. 14, 1975, 28 U.S.T. 695 [hereinafter Registration Convention].

24. *opened for signature* Dec. 18, 1979, 1363 U.N.T.S. 22 [hereinafter Moon Treaty].

25. Loren Grush, *How an International Treaty Signed 50 Years Ago Became the Backbone for Space Law*, THE VERGE (Jan. 27, 2017, 11:14 AM EST), <https://www.theverge.com/2017/1/27/14398492/outer-space-treaty-50-anniversary-exploration-guidelines> [hereinafter Grush, *Backbone for Space Law*].

26. *See id.* (“Both the US and the Soviet Union wanted to prevent the expansion of the nuclear arms race into a completely new territory.”).

27. Christopher D. Johnson, *Insight - 2017 and the Fiftieth Anniversary of the Outer Space Treaty*, SECURE WORLD FOUND. (Jan. 16, 2017), <https://swfound.org/news/all-news/2017/01/insight-2017-and-the-fiftieth-anniversary-of-the-outer-space-treaty>.

28. Outer Space Treaty, *supra* note 20, art. I.

controversies related to ownership rights—especially on Outer Space mining²⁹—it has guaranteed that all nations can freely explore and access Outer Space.

Although written more than fifty years ago, the Outer Space Treaty was visionary for its time and is still remarkably relevant today. For instance, during the negotiations, the parties grappled with the topic of private commercial activities in Outer Space. The Soviet Union originally wanted to limit activities in Outer Space to those of national governments only.³⁰ But the United States wanted to retain the ability for private enterprises to develop and flourish in Outer Space.³¹ Ultimately, a compromise was reached in which private commercial activities were allowed in Outer Space but only if they are first authorized by a State party who will be liable for such activities.³² By enabling commercial corporations to participate, this framework paved the way for the success of private parties, such as Space Exploration Technologies Corporation—better known as “SpaceX”—today.³³

While the treaty dictates that Outer Space “is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means,”³⁴ it has certain provisions related to jurisdictional authority. Article VIII of the Outer Space Treaty indicates that a nation “on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof.”³⁵ The treaty further emphasizes that ownership over an object is “not affected by [its] presence in outer space or on a celestial body or by [its] return to the Earth.”³⁶ Therefore, like

29. Alex S. Li, *Mining for the Future*, #THESPACEBAR (Oct. 24, 2017), <https://alexli.com/thespacebar/2017/10/24/mining-for-the-future>.

30. *See* Comm. on the Peaceful Uses of Outer Space, Union of Soviet Socialist Republics: Draft Declaration of the Basic Principles Governing the Activities of States Pertaining to the Exploration and Use of Outer Space, ¶ 7, U.N. Doc. A/AC.105/L.2 (Sept. 10, 1962) (“All activities of any kind pertaining to the exploration and use of outer space shall be carried out *solely and exclusively by States . . .*”) (emphasis added).

31. Christopher D. Johnson, *The Outer Space Treaty at 50*, SPACE REV. (Jan. 23, 2017), <https://www.thespacereview.com/article/3155/1>.

32. Outer Space Treaty, *supra* note 20, art. VI.

33. *See* Alex S. Li, *Made in America: The Maiden Flight of NASA’s Commercial Crew*, #THESPACEBAR (May 30, 2020), <https://alexli.com/thespacebar/2020/5/26/made-in-america-the-maiden-flight-of-the-commercial-crew> (noting SpaceX became “(1) the first commercial entity with manned capabilities to Outer Space and (2) the first crewed launch provider for a national space agency”).

34. Outer Space Treaty, *supra* note 20, art. II.

35. *Id.* art. VIII.

36. *Id.*

a ship at sea, the nation under which the space-faring object is flagged shall retain jurisdiction over all activities for such object.

The Outer Space Treaty officially opened for signatures on January 27, 1967, and entered into force on October 10, 1967.³⁷ As of May 18, 2021, 110 countries are parties to the Outer Space Treaty, while another twenty-three countries have signed but not ratified the treaty.³⁸ Developed at a time when space-related activities were still in their infancy, the treaty is designed to be simple.³⁹ Because of this characteristic, the Outer Space Treaty is susceptible to multiple interpretations which limit its practical use. However, as the first major international treaty on space, the Outer Space Treaty has served as the fundamental backbone for every piece of major space-related legislation passed in the last five and a half decades.

B. Rescue Agreement of 1968

The Rescue Agreement is the shortest of these five Outer Space treaties and is intended to further clarify Article V of the Outer Space Treaty.⁴⁰ Under the Rescue Agreement, should a nation become aware of an object/crew in distress, that party would notify both the United Nations Secretary-General and the State that is responsible for such object/crew.⁴¹ Additionally, if such object/crew lands in an area under a country's control or where a nation could assist, then such sovereign should render all possible assistance to rescue or retrieve the object/crew.⁴²

The Rescue Agreement has two interesting characteristics: one related to the definition for “*launching authority*” and the other related to the phrase “*personnel of a spacecraft*.”

In Article VI, the Rescue Agreement includes “intergovernmental organization” as a part of the definition for a “*launching authority*.”⁴³ As one of the first major international treaties that enables an “*intergovernmental*

37. U.N. OFF. FOR OUTER SPACE AFFS., STATUS OF INTERNATIONAL AGREEMENTS RELATING TO ACTIVITIES IN OUTER SPACE AS AT 1 JANUARY 2020, at 1 (2020), <https://www.unoosa.org/documents/pdf/spacelaw/treatystatus/TreatiesStatus-2020E.pdf> [hereinafter U.N. TREATIES STATUS].

38. *Id.* at 10.

39. Grush, *Backbone for Space Law*, *supra* note 25 (“The Outer Space Treaty was never intended to be comprehensive, though.”).

40. *See* Rescue Agreement, *supra* note 21, pmbl. (“*Desiring* to give further concrete expression to the rights and obligations contained in the [Outer Space Treaty] . . .”).

41. *Id.* arts. I, V.

42. *Id.* arts. II–III, V.

43. *Id.* art. VI (emphasis added).

organization” to have the same level of authority as a national government,⁴⁴ the Rescue Agreement might have been a harbinger for the eventual creation of the European Union.⁴⁵

Second, instead of using the term “astronaut[],” as listed in the Outer Space Treaty,⁴⁶ all throughout its articles, the Rescue Agreement uses the term “personnel of a spacecraft” to describe the crew. The difference in terminology has led some to argue that this may be the drafters’ deliberate intent to indicate that the word “astronaut” should not be synonymous with the phrase “personnel of a spacecraft.”⁴⁷ However, because the formal title to the Rescue Agreement contains the word “astronaut,” drafters might have written “personnel” so that the Agreement would apply to “astronauts”—a largely American-centric term, “cosmonauts”—a largely Russian-centric term, and any other “-onauts” term that might appear such as “taikonauts”—a Chinese-centric term.⁴⁸ But, this word does beg the question of who is considered “personnel of a spacecraft.” Is the term specifically limited to “-onauts” and other professional flight participants, or would it include space tourists as well?⁴⁹

The Rescue Agreement officially opened for signatures on April 22, 1968, and entered into force on December 3, 1968.⁵⁰ As of May 18, 2021, ninety-eight countries are parties to the Rescue Agreement and another twenty-three countries have signed the agreement.⁵¹

44. See Frans G. von der Dunk, *A Sleeping Beauty Awakens: The 1968 Rescue Agreement After Forty Years*, 34 J. SPACE L. 411, 421 (2008) (stating that the Rescue Agreement provided the “possibility for intergovernmental organizations to be equated to states under their respective regimes. In this respect, the Rescue Agreement was the first of its kind, not only in space law, but also from a broader perspective.”).

45. Cf. *id.* (“Opening up partisanship to treaties to an intergovernmental organisation on a formal (and more or less equal) level indeed remained confined initially to the space arena. Outside of space law, only the advent of the European Union in the last decade of the twentieth century as a supranational power caused partisanship of the individual EU member states to certain treaties to be partly emptied of meaning.”).

46. Outer Space Treaty, *supra* note 20, art. V (emphasis added) (“States Parties to the Treaty shall regard astronauts as envoys of mankind in outer space and shall render to them all possible assistance in the event of accident, distress, or emergency landing on the territory of another State Party or on the high seas.”).

47. von der Dunk, *supra* note 44, at 421–22 (emphases added).

48. *Id.* at 417, 421–22 (emphases added).

49. See Alex S. Li, *Are Space Tourists Astronauts?*, #THESPACEBAR, <https://alexsl.com/thespacebar/2017/11/12/are-space-tourists-astronauts> (last visited Feb. 26, 2021) (noting space tourists likely would not be able to designate themselves as “astronauts”).

50. U.N. TREATIES STATUS, *supra* note 37, at 1.

51. *Id.* at 10.

C. Space Liability Convention of 1972

The Space Liability Convention expands on the liability regime introduced in Article VII of the Outer Space Treaty.⁵² While the document sets up two standards for liability, it dictates that claims can only be submitted by a national entity.⁵³ If a private entity wishes to file a claim under the convention, then that entity will need to petition its government to make a claim on its behalf.⁵⁴

Under the Space Liability Convention, depending on the location of the damage, there are two standards of liability: absolute liability and fault-based liability. If the damage is caused by a country's object "on the surface of the Earth or to [an] aircraft in flight," that nation is absolutely liable for any and all such damage.⁵⁵ That State would even be responsible for damages caused by circumstances beyond its control in those locations. But, for damages caused by a country's object anywhere else—such as in Outer Space—that sovereign is only liable for the damages of "its fault or the fault of persons for whom it is responsible."⁵⁶ So for damages that occur in Outer Space, causation will play a role in the determination of liability. Under both regimes, when more than one entity is at fault, all responsible countries will be jointly and severally liable for the damages.⁵⁷

The Space Liability Convention also establishes a basic jurisdictional framework to resolve conflicts in Outer Space. Under the treaty, the parties will first attempt to resolve the dispute on their own.⁵⁸ However, if no resolution is achieved after a certain amount of time, the convention provides for the establishment of a "Claims Commission at the request of either party."⁵⁹ The commission will be made up of three members—one appointed by each party and the chairperson jointly agreed to by the parties involved,⁶⁰ if the parties cannot agree on the chairperson, then the United Nations Secretary-General will appoint this member.⁶¹ The Claims Commission will determine its administrative

52. See Space Liability Convention, *supra* note 22, pmbl. ("Recalling the [Outer Space Treaty] . . . [and] [r]ecognizing the need to elaborate effective international rules and procedures concerning liability . . .").

53. *Id.* art. II–III, VIII.

54. *Id.* art. VIII (allowing only state parties to present a claim).

55. *Id.* art. II.

56. *Id.* art. III.

57. *Id.* art. IV, ¶ 1.

58. *Id.* art. IX.

59. *Id.* art. XIV.

60. *Id.* art. XV, ¶ 1.

61. *Id.* art. XV, ¶ 2.

procedures and decide by majority vote.⁶² Hence, this “adjudication commission” can have complete jurisdictional authority over the dispute resolution process.

As of May 18, 2021, only one claim has been made under the Space Liability Convention. In January 1978, a Soviet Union nuclear-powered satellite, Kosmos 954, crash-landed in Canada.⁶³ Because some of the debris fragments were still radioactive, the recovery and clean-up process proved costly.⁶⁴ Since the debris caused damage “on the surface of the Earth,”⁶⁵ pursuant to the Space Liability Convention, the Soviet Union would be absolutely liable for all costs associated with damages caused by Kosmos 954’s crash. For these reasons, Canada presented the Soviet Union with a claim of \$6,041,174.70 Canadian dollars for Kosmos 954’s recovery and clean-up expenses.⁶⁶ The Soviet Union eventually agreed to pay about three million Canadian dollars.⁶⁷

The Space Liability Convention officially opened for signatures on March 29, 1972, and entered into force on September 1, 1972.⁶⁸ As of May 18, 2021, ninety-eight countries are parties to the Space Liability Convention and another nineteen countries have signed the instrument.⁶⁹ Although only one claim has been made under the Space Liability Convention,⁷⁰ this treaty might become more relevant as defunct satellites and rocket parts increasingly obstruct Earth’s orbits.

62. *Id.* art. XVI, ¶¶ 3–5.

63. Timothy G. Nelson, *Regulating the Void: In-Orbit Collisions and Space Debris*, 40 J. SPACE L. 105, 105 (2015-2016).

64. See Alexander F. Cohen, *Cosmos 954 and the International Law of Satellite Accidents*, 10 YALE J. INT’L L. 78, 80 (1984) (“The joint U.S.-Canadian cleanup operation that resulted from this exchange, dubbed ‘Operation Morning Light,’ cost Canada nearly C\$14 million, while the U.S. spent some U.S. \$2-2.5 million.”).

65. Space Liability Convention, *supra* note 22, art. II.

66. Robert Gillette, *Soviets Ready to Discuss Liability Pact for Nuclear Mishaps: Moscow Won’t Compensate West for Chernobyl Damage but Will Consider Question for Future*, L.A. TIMES (Oct. 6, 1986, 12:00 AM PT), <https://www.latimes.com/archives/la-xpm-1986-10-06-mn-4518-story.html>.

67. Cohen, *supra* note 64, at 80.

68. U.N. TREATIES STATUS, *supra* note 37, at 1.

69. *Id.* at 10.

70. Although only one claim has been made under the Space Liability Convention, several incidents could have led to claims under this treaty. See Alexander P. Reinert, *Updating the Liability Regime in Outer Space: Why Spacefaring Companies Should Be Internationally Liable for Their Space Objects*, 62 WM. & MARY L. REV. 325, 337–38 (2020) (noting that “numerous other incidents on Earth” and in Outer Space “could have invoked the Space Liability Convention”).

D. Registration Convention of 1975

Like the Rescue Agreement and the Space Liability Convention, the Registration Convention also elaborates on principles introduced in the Outer Space Treaty.⁷¹ Specifically, the Registration Convention lays the foundation for a registration system to account for objects in space.⁷²

While a relatively straightforward treaty, this convention plays a critical role in giving teeth to and ensuring the success of other space-related treaties. For instance, the Registration Convention effectuates the Rescue Agreement.⁷³ A party will not be able to fulfill its notification obligations if it becomes aware of an object in distress that is not properly identified;⁷⁴ even if such country wants to help, it will not know whom to contact. The Registration Convention is also important for the implementation of the Space Liability Convention.⁷⁵ Under the Space Liability Convention, liabilities for damages done by space-faring objects are appropriated among the nations involved in the incident.⁷⁶ Therefore, this liability framework is also heavily dependent on the proper registration and identification of objects in Outer Space.

The Registration Convention officially opened for signatures on January 14, 1975, and entered into force on September 15, 1976.⁷⁷ Perhaps because of the potential for liabilities, many non-space-faring nations have not ratified the convention, and this treaty has one of the lowest ratification rates of these space-related treaties.⁷⁸ As of May 18, 2021, seventy countries are parties to the Registration Convention and another three countries have signed the instrument.⁷⁹

71. See Registration Convention, *supra* note 23, pmb1. (“Recalling that the [Outer Space Treaty] . . . refers to the State on whose registry an object launched into outer space is carried . . .”).

72. See *id.* (“Believing that a mandatory system of registering objects launched into outer space would, in particular, assist in their identification and would contribute to the application and development of international law . . .”).

73. See *id.* (“Recalling also that the [Rescue Agreement] provides that a launching authority shall, upon request, furnish identifying data prior to the return of an object it has launched into outer space . . .”).

74. See Rescue Agreement, *supra* note 21, art. I.

75. See Registration Convention, *supra* note 23, pmb1. (“Recalling further that the [Liability Convention] establishes international rules and procedures concerning the liability of launching States for damage caused by their space objects . . .”).

76. Space Liability Convention, *supra* note 22, art. IV, ¶ 1.

77. U.N. TREATIES STATUS, *supra* note 37, at 2.

78. *Id.* at 10.

79. *Id.*

E. Moon Treaty of 1979

Although a part of the five major United Nation treaties related to Outer Space, the Moon Treaty is regarded as a failed agreement because of its lack of acceptance among space-faring nations.⁸⁰

The Moon Treaty further elaborates on concepts introduced in the Outer Space Treaty by focusing specifically on the Moon and other celestial bodies in the Solar System.⁸¹ It attempts to lay a foundation for claiming and appropriating resources on the Moon by borrowing the “Enterprise” concept⁸² from the Law of the Sea—specifically, the Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982.⁸³ Central to this system, the Moon Treaty declares that “[t]he Moon and its natural resources are the common heritage of mankind . . . [and] is not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means.”⁸⁴ Similar to the application of the “Enterprise” system to oceanic resources, this treaty notes that the natural resources of the Moon are entitled to “equitable sharing by all State Parties in the benefits derived from those resources.”⁸⁵ Hence, even if one country “dug up” these resources, that nation would not have complete and exclusive ownership and control over such resources.

Furthermore, the Moon Treaty also forbids any individuals, entities, or governments from owning any “surface or the subsurface of the moon or any areas thereof.”⁸⁶ This is a controversial proposition as it raises important property questions related to both Outer Space mining⁸⁷ and ownership rights on celestial bodies such as Mars.⁸⁸

80. Michael Listner, *The Moon Treaty: Failed International Law or Waiting in the Shadows?*, SPACE REV. (Oct. 24, 2011), <https://www.thespacebar.com/article/1954/1>.

81. Moon Treaty, *supra* note 24, pmbl.

82. See Listner, *supra* note 80 (“[I]t is probable that it would be similar in form to the international regime called ‘The Enterprise’ . . .”). “The Enterprise” describes an arrangement where developed nations and private companies allocate a portion of the resources that they collect to an international regime (the Enterprise), which then distributes those resources among developing nations. *Id.*

83. Nov. 16, 1994, 1836 U.N.T.S. 3.

84. Moon Treaty, *supra* note 24, art. XI, ¶¶ 1–2.

85. *Id.* art. XI, ¶ 7(d).

86. *Id.* art. XI, ¶ 3.

87. See Li, *supra* note 29.

88. See Alex S. Li & Sean McCormick, *Can People Stake Claims on Mars?*, #THESPACEBAR (July 30, 2017), <https://alexli.com/thespacebar/2017/7/30/can-people-stake-claims-on-mars>.

The Moon Treaty officially opened for signatures on December 18, 1979, and entered into force on July 11, 1984.⁸⁹ But, because most space-faring nations (including the United States, Russia, China, Japan, and several members of the European Space Agency) have not ratified, signed, or acceded to the Moon Treaty, the agreement does not have widespread practical effect. As of May 18, 2021, only eighteen countries are parties to the Moon Treaty and another four countries have signed the instrument.⁹⁰

While Outer Space law is still very much in its infancy, these five United Nations treaties will always serve as the earliest international legal guideposts for this territory. However, the boundary for Outer Space—and when these treaties become applicable—remains fluid to this day. The next section will shed light on this uncertainty and propose a new solution for this demarcation problem.

II. Where Does Outer Space Begin?

The first step in determining the jurisdictional authority for a space-based incident is to verify such conflict actually took place in “Outer Space.” Although this seems like a trivial matter, there is no official or universally accepted boundary for Outer Space.⁹¹ What appears to be a strange omission has a simple geopolitical reason: access to airspace. For countries with air supremacy, not having a definitive Outer Space border is immensely useful. Without an internationally recognized line for the beginning of Outer Space, these nations would have unfettered access to the air space above any foreign country as long as their planes are flying “high enough.” The lack of a clear boundary provides these States with legal air cover that their planes did not trespass into another nation’s territory.⁹²

Hence, the United States, with air superiority second to none,⁹³ has strenuously rejected all efforts to create a firm demarcation line for Outer Space. Its rationale

89. U.N. TREATIES STATUS, *supra* note 37, at 2.

90. *Id.* at 10.

91. IISL Replies, *supra* note 16, at 1.

92. See Loren Grush, *Why Defining the Boundary of Space May Be Crucial for the Future of Spaceflight: It Could Change How We Regulate Vehicles in the Sky*, THE VERGE (Dec. 13, 2018, 2:43 PM EST), <https://www.theverge.com/2018/12/13/18130973/space-karman-line-definition-boundary-atmosphere-astronauts> [hereinafter Grush, *Future of Spaceflight*] (“If there is an internationally agreed upon solid line for where space begins, then other countries could cry foul if the U.S. flies at a super-high altitude above a foreign territory, but below the space line.”).

93. See Tom O’Connor, *How Does Russia’s Air Force Compare to America’s?*, NEWSWEEK (Apr. 28, 2018, 6:00 AM EDT), <https://www.newsweek.com/how-does-russia-air-force-compare-us-904377a> (“The U.S. commands by far the largest airfleet in the world . . .”).

“continues to be that defining or delimiting outer space is not necessary. No legal or practical problems have arisen in the absence of such a definition.”⁹⁴ Without a boundary, it is hard for any country to block a foreign nation’s overhead flights because no one can definitely prove where “high enough” starts. But, the basic tenet behind this intentional omission might be falling apart in this new space age. As more and more commercial entities develop the capability to reach altitudes that were once reserved to government entities, the need for a boundary grows. Without a line defining where Outer Space begins, uncertainties related to jurisdiction, policy, and liability could cause legal headaches and impede further progress in Outer Space.

This Part begins by summarizing the leading positions on the boundary for Outer Space. Using an amalgamation of these perspectives, this Part will continue by introducing a hybrid solution for a demarcation line. This proposal would set the Outer Space border at an altitude of eighty kilometers above mean sea level and would also establish a “Transitional Outer Space Zone” between eighty and 100 kilometers.⁹⁵ Helping to address geopolitical concerns, this Transitional Outer Space Zone (“TOS Zone”) shall be modeled after the “Exclusive Economic Zone” from the 1982 United Nations Convention on the Law of the Sea.⁹⁶ In the TOS Zone, all countries will have the freedom to operate as long as their activities do not impede on the territorial integrity of the nation below such zone.

A. The Three Leading Perspectives on the Boundary for Outer Space

There are three boundaries for Outer Space that have garnered support within the space community: (1) the Kármán Line, (2) the Astronaut Badge Line, and (3) the Mission Intent Line.

1. The Kármán Line

With the need for a firm demarcation line growing, the first candidate that many look to is the Kármán Line. Located at 100 kilometers (about sixty-two miles) above mean sea level, this line is named after the Hungarian-American

94. Definition and Delimitation of Outer Space and the Character and Utilization of the Geostationary Orbit: Statement by the Delegation of the United States of America, Legal Subcomm. of the U.N. Comm. on the Peaceful Uses of Outer Space (Apr. 2001), <https://2009-2017.state.gov/s/l/22718.htm> [hereinafter *Delimitation of Outer Space*].

95. *See infra* note 120.

96. *opened for signature* Dec. 10, 1982, 1833 U.N.T.C. 3 [hereinafter *Law of the Sea*].

engineer and physicist Theodore von Kármán.⁹⁷ Currently, this is the official boundary for the beginning of Outer Space used by the World Air Sports Federation—officially the Fédération Aéronautique Internationale (FAI).⁹⁸ Since the FAI is the record-keeper of various world records for aerospace and spaceflight activities,⁹⁹ the Kármán Line is the unofficial gold standard of Outer Space borders.

Through his aerospace research, von Kármán discovered that at a certain altitude, the atmosphere becomes so thin that the speed needed—the forward thrust—to keep the object in the air is close to or faster than the orbital speed at that altitude.¹⁰⁰ At that level, centrifugal forces would take over and the object could stay in the air simply due to free fall rather than forward thrust.¹⁰¹ In other words, at this altitude, orbital mechanics (e.g., free fall) is more important than aerodynamic operations (e.g., lift).

Von Kármán calculated this altitude to be 83.8 kilometers (about fifty-two miles above mean sea level).¹⁰² While von Kármán was not trying to define the boundary of Outer Space via his research, the result was eventually adapted for this use.¹⁰³ Instead of an exact altitude of 83.8 kilometers, von Kármán and FAI agreed to use the easier to remember and more round number of 100 kilometers as the start of Outer Space.¹⁰⁴ Thus, the 100 kilometers “Kármán Line” was born.

While the use of the Kármán Line as the boundary for Outer Space has broad support, it is not universally adopted.¹⁰⁵ Detractors have rejected this border for a variety of reasons. Some note that the revision upward to 100 kilometers would neglect the scientific evidence (and von Kármán’s own calculations) that aircraft

97. S. Sanz Fernández de Córdoba, *100KM Altitude Boundary for Astronautics*, FAI ASTRONAUTIC RECS. COMM’N (June 21, 2004), <https://www.fai.org/page/icare-boundary>.

98. See FÉDÉRATION AÉRONAUTIQUE INTERNATIONALE, FAI SPORTING CODE: SECTION 8—ASTRONAUTICS 6 (Apr. 17, 2009), <https://naa.aero/userfiles/files/documents/Downloads/Sporting%20Code%20Section%208%20Edition%202009.pdf> (“All flights must exceed an altitude of 100 km in order to qualify for [Outer Space] records.”).

99. See Córdoba, *supra* note 97.

100. *Id.*

101. *Id.*

102. Grush, *Future of Spaceflight*, *supra* note 92.

103. Córdoba, *supra* note 97.

104. See Grush, *Future of Spaceflight*, *supra* note 92 (“Around 1960, the FAI decided to set the limit at 100 kilometers”); see also Córdoba, *supra* note 97 (“It was apparently Von Karman himself who realised, and proposed to the rest, the very round number of 100 Km (very close to the calculated number). The rest of the people eagerly accepted it.”).

105. Jonathan C. McDowell, *The Edge of Space: Revisiting the Karman Line*, 151 ACTA ASTRONAUTICA 668, 668 (2018).

loses aerodynamic control at an altitude much lower.¹⁰⁶ Others argue that technological advancements will eventually render this focus on empirical characteristics myopic.¹⁰⁷ With criticism abound, several alternative demarcation lines have gained traction.

2. *The Astronaut Badge Line*

Recently, the FAI announced that it is looking into whether to change its boundary for Outer Space.¹⁰⁸ One replacement candidate that the organization has raised is an altitude of eighty kilometers (about fifty miles above mean sea level).¹⁰⁹

This altitude has some indirect support, especially coming out of the United States. This Article refers to this fifty-mile line as the “Astronaut Badge Line” because it represents the threshold for the United States Air Force to award the astronaut badge¹¹⁰—both the National Aeronautics and Space Administration (NASA) and the Federal Aviation Administration (FAA) appear to do the same.¹¹¹ By awarding individuals with this stamp of approval, these agencies are implicitly demonstrating their support for the concept that activities past the Astronaut Badge Line are space-related. With the United States a major player in Outer Space, this inferential endorsement—albeit not its official position¹¹²—

106. See Timothy G. Nelson, *Where Does Space Begin? The Decades-Long Legal Mission to Find the Border Between Air and Space*, SPACENEWS (Mar. 26, 2019), <https://spacenews.com/op-ed-where-does-space-begin-the-decades-long-legal-mission-to-find-the-border-between-air-and-space> (“[T]he U.S. Air Force awards astronaut wings to any pilot who has gone above 80 kilometers, apparently on the basis that aircraft that fly above that altitude . . . have no aerodynamic control.”).

107. See *id.* (“Even if the line is fixed at a given distance such as 100 kilometers, technological advances may render that border unsound.”); see also *Delimitation of Outer Space*, *supra* note 94 (“It would be dangerous . . . to agree to an artificial line between air space and outer space, when it cannot predict the consequences of such a line.”).

108. *Statement About the Karman Line*, FÉDÉRATION AÉRONAUTIQUE INTERNATIONALE (Nov. 30, 2018), <https://www.fai.org/news/statement-about-karman-line>.

109. *Id.*

110. See DEP’T OF THE AIRFORCE, AVIATION AND PARACHUTIST SERVICE, AERONAUTICAL RATINGS, AND AVIATION BADGES 22 (Aug. 17, 2016) (providing that an officer “qualified to perform duties in space (50 miles above the earth’s surface) who completes a minimum of one operational mission is eligible for the astronaut qualifier”).

111. See Grush, *Future of Spaceflight*, *supra* note 92 (“NASA does the same. And while the Federal Aviation Administration does not have an official definition, it usually gives out astronaut badges to those who have gone above 50 miles.”).

112. *Delimitation of Outer Space*, *supra* note 94 (“[The United States’] position continues to be that defining or delimiting outer space is not necessary.”).

should carry some weight. Hence, making the Astronaut Badge Line the official boundary for Outer Space has a strong foundation.

Additionally, there is scientific support for this line as the demarcation for Outer Space. As discussed earlier,¹¹³ von Kármán found that orbital mechanics become more important than aerodynamic forces in keeping an object in the air at about an altitude of 83.8 kilometers (or fifty-two miles).¹¹⁴ Thus, the Astronaut Badge Line at eighty kilometers/fifty miles is a much more accurate approximation to this altitude than the current 100 kilometers measurement for the Kármán Line. Therefore, if the reason behind the FAI's current demarcation is based on von Kármán's scientific discoveries, then the boundary should be drawn at a level that stays truer to von Kármán's research.

But, the Astronaut Badge Line is still not recognized as the official Outer Space border by any country. Even while the United States awards astronaut badges for individuals passing the fifty-mile altitude threshold, it still does not support a demarcation line for Outer Space.¹¹⁵ The United States' resistance here is likely the result of its air supremacy.¹¹⁶ With commercial entities now having the ability to traverse the Astronaut Badge Line,¹¹⁷ entering "Outer Space" is more accessible than ever before. Similar to how air travel became available to the masses,¹¹⁸ the democratization of Outer Space is likely inevitable. While this development is a net positive, the increasing ease in crossing the Astronaut Badge Line will make its official adoption as the Outer Space border difficult. Countries with air supremacy would worry the line could negate their technological advantage and broaden the exclusive club of sovereigns that can perform "spaceflights" over another State's territory. Likewise, countries without

113. *See supra* Section II.A.1.

114. THOMAS GANGALE, *HOW HIGH THE SKY?: THE DEFINITION AND DELIMITATION OF OUTER SPACE AND TERRITORIAL AIRSPACE IN INTERNATIONAL LAW* 133 (2018).

115. *Delimitation of Outer Space*, *supra* note 94 ("[The United States'] position continues to be that defining or delimiting outer space is not necessary.").

116. Grush, *Future of Spaceflight*, *supra* note 92.

117. *See* Loren Grush, *With Shiny New Badges, Virgin Galactic Pilots Join Elite Group of Commercial Astronauts*, *THE VERGE* (Feb. 8, 2019, 10:29 AM EST), <https://www.theverge.com/2019/2/8/18216268/virgin-galactic-pilots-forger-stucky-cj-sturckow-faa-commercial-astronaut-wings> ("[B]y crossing an altitude of 50 miles in a commercial vehicle, the two had qualified for the Federal Aviation Administration's commercial astronaut wings.").

118. *See The Era of Mass Air Travel Begins*, SMITHSONIAN NAT'L AIR & SPACE MUSEUM, <https://airandspace.si.edu/exhibitions/america-by-air/online/heyday/heyday11.cfm> (last visited May 2, 2021) ("With the steady increase in passenger traffic, the level of personal service decreased. The stresses of air travel began to replace the thrill. Flying was no longer a novelty or an adventure; it was becoming a necessity.").

advanced air capabilities would argue the line is too low to effectively halt overhead surveillance flights by other nations. Hence, the lack of geopolitical support would likely make the universal acceptance of the Astronaut Badge Line extremely difficult, if not dead on arrival.

3. The Mission Intent Line

Finally, a perspective envisioned by Thomas Gangale that has garnered interest recently is to define Outer Space by the intention of the object rather than by an altitude. Under what this Article calls the “Mission Intent Line,” Gangale argues that it is the planned destination of the airborne object that should define its classification as a spacecraft or aircraft.¹¹⁹

Under this test, even if the object does not reach Outer Space, it would still be classified as a spacecraft if it intended to travel to Outer Space. Hence, if such a launch were to fail, the resulting legal liabilities would be determined through space-related rules and regulations rather than the ones governing airplane operations.

However, by making the test subjective and based on the intention of the object, this perspective literally blurs the line. This will introduce additional ambiguities. For instance, it could lead to individuals abusing the system by outwardly stating intentions of reaching Outer Space even if that is not their actual goal. When the legal system turns strictly on perceived subjective intent, entities are incentivized to choose the legal regime most favorable for them. This also creates a policing problem: other than clear-cut cases, no one can ever prove with certainty whether an object is meant to be a spacecraft or an aircraft.

B. A Demarcation Proposal that Considers Objectivity and Subjectivity

As the discussion reveals, the three leading perspectives on the boundary for Outer Space are either derived solely on objective factors (the Kármán Line and the Astronaut Badge Line) or subjective factors (the Mission Intent Line). However, a better solution might be found in a blended option that balances the need for a distinct physical marker but also considers the intent of an object. In this section, this Article introduces a proposal that balances objectivity and subjectivity by setting the Outer Space border at an altitude of eighty kilometers above mean sea level and creating a “Transitionary Outer Space Zone” (“TOS

119. See Grush, *Future of Spaceflight*, *supra* note 92 (“Gangale argues that a spacecraft should be defined by where it’s meant to go.”).

Zone”) between the altitudes of eighty kilometers to 100 kilometers above mean sea level.¹²⁰

First, an altitude of eighty kilometers above mean sea level should be used as the demarcation for Outer Space. This altitude would align with current objective scientific evidence demonstrating that, close to this altitude, the aeronautic principle of orbital velocity becomes more important than the aeronautical concept of lift for an object to stay in flight.¹²¹ Since Outer Space travel considers principles of gravitational forces (e.g., planning a free-return trajectory from the Moon or using the Hohmann transfer orbit) rather than atmospheric factors, this makes the eighty kilometers line the perfect transition level; an object must be in the realm of Outer Space once it is no longer primarily at the whim of any planetary factors. Since this scientific boundary had been calculated through approximation, rounding it to eighty kilometers would make this line far more precise than the 100 kilometers line currently supported by some.

However, this eighty kilometers boundary will only achieve universal acceptance if it overcomes the geopolitical challenges that have historically hindered global acceptance of a demarcation line. A twenty kilometers TOS Zone between the altitudes of eighty kilometers to 100 kilometers above mean sea level can do just this.¹²² Any foreign nation’s space-faring object would have permissible passage in another nation’s TOS Zone as long as the intent of such nation’s object falls within certain lawful activities.

The TOS Zone would operate very similarly to the “Exclusive Economic Zone” introduced in the Law of the Sea.¹²³ In an Exclusive Economic Zone, the adjacent state would have exclusive “sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources [of such zone]. . . .”¹²⁴ However, other nations would still enjoy in the Exclusive Economic Zone, “the freedoms . . . of navigation and overflight . . . and other internationally lawful uses of the sea related to these freedoms, such as those associated with the operation of ships, aircraft and submarine cables and pipelines.”¹²⁵ Hence, while

120. Recognizing the existing support for altitudes of eighty kilometers and 100 kilometers above mean sea level as the Outer Space border, this Article poses a height of twenty kilometers for the TOS Zone to bridge the gap between these two perspectives. However, as goals shift and technologies advance, the actual size of the TOS Zone can be shrunk or expanded.

121. *See supra* Section II.A.1.

122. *See supra* note 120.

123. *See* Law of the Sea, *supra* note 96.

124. *Id.* art. 56, ¶ 1(a).

125. *Id.* art. 58, ¶ 1.

the coastal state could claim the resources of such zone, it must allow other nations unimpeded access to this territory for lawful reasons.

The TOS Zone would port the Exclusive Economic Zone into Outer Space. All spacecrafts would have the permissionless ability to traverse freely for certain lawful reasons in the TOS Zone. While any objects of the nation operating in its own TOS Zone would not be subject to restrictions, any foreign spacecrafts within another nation's TOS Zone would be prohibited from loitering in such area. These activities could include:¹²⁶ (1) aimlessly circling around and remaining in another nation's TOS Zone without permission, (2) annoying or harassing a nation within its own TOS Zone, (3) interfering or impeding the activities of a nation in its own TOS Zone (when this occurs, such foreign nation's objects must safely give way), or (4) building or operating any permanent hovering "spacebase" in another nation's TOS Zone (when it becomes technologically feasible).

By defining a certain set of allowable activities in the TOS Zone, this proposal should alleviate certain nations' concerns that a bright-line boundary would restrict such nations' abilities to operate with a certain level of impunity above other nations' airspaces. At the same time, with a bright-line boundary accompanying the TOS Zone, the country below each TOS Zone can rest assured knowing that foreign nations do not have unfettered access in the sky above. This should provide enough legal air cover such that an Outer Space demarcation line at eighty kilometers above mean sea level can become readily acceptable to a supermajority of nations. With this foundation set, an authority determination framework for addressing conflicts in Outer Space can be more firmly applied.

III. An Authority Determination Framework for Outer Space

Because Outer Space is owned by no one and is a part of humanity's common heritage,¹²⁷ an important question arises: who has the authority to investigate and resolve disputes in this sector? Typically, the nation that can assert sovereign domain over a territory would have full jurisdictional authority for that area, but this cannot be directly applied to Outer Space. But, because nations can claim ownership over particular objects in Outer Space, jurisdictional authority can turn on a conflict's specific facts and circumstances. Hence, this Part will construct a

126. Flexibility and adaptability are at the heart of this solution. As technologies advance and global policies change, the type of activities that would be permitted, restricted, or prohibited in the TOS Zone can change with the times.

127. *See supra* Section I.A.

framework that can be used to determine the appropriate jurisdictional authority for a particular incident.

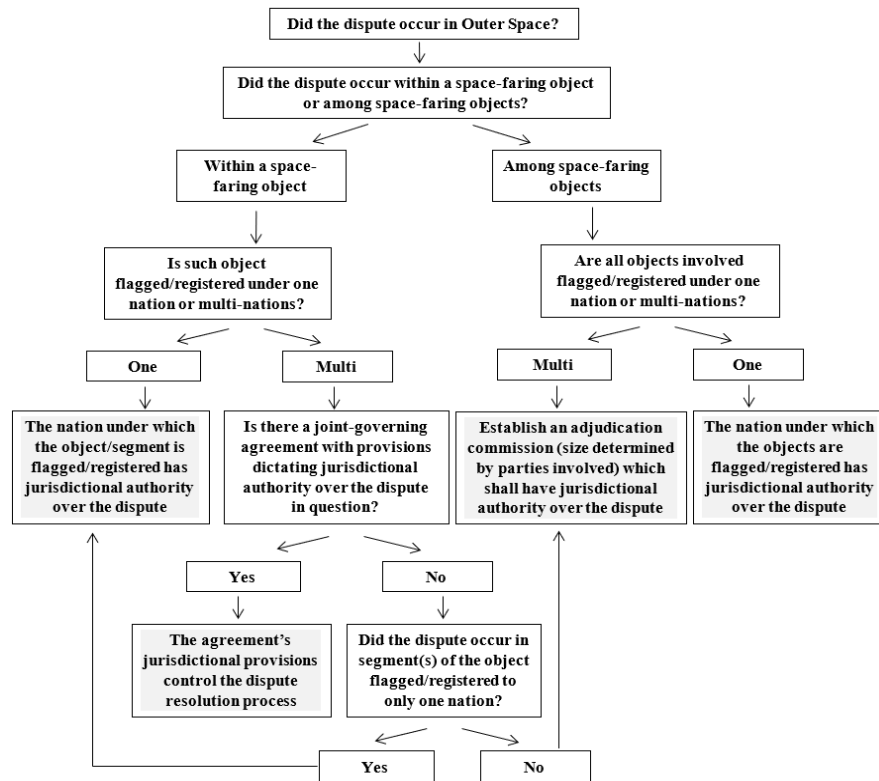


Figure One: A Decision Tree Analysis for Determining Jurisdiction Authority

While each step will be explained in depth, at its core, the framework relies on answering the following questions:

- Did the dispute occur in Outer Space?
- Did the dispute occur within a space-faring object or among multiple space-faring objects?
- If the dispute involves multiple objects: are they all flagged under one nation?
- If the dispute occurred in a space-faring object: how is such object flagged?

- If the space-faring object is flagged under a collective of nations: is there a governing agreement among these nations?
- If there is no governing agreement: did the dispute take place in segment(s) of the space-faring object flagged under one particular nation?

A. Step One: Did the Incident Take Place in Outer Space?

In order to determine the appropriate jurisdictional authority, the first question that must be addressed is whether the conflict took place in Outer Space. As there is no universally accepted definition for the beginning of Outer Space,¹²⁸ this could be a tricky question for borderline cases. However, if the proposed framework in Section II.B is adopted worldwide, then a conflict would have taken place in Outer Space as long as damages occurred eighty kilometers above mean sea level.¹²⁹ By corollary, this framework will not be used to determine the jurisdictional authority for resolving conflicts below eighty kilometers. For such an event, existing international frameworks would apply as the incident would have either taken place in an area under a nation's control or in international areas where existing legal regimes, such as the Law of the Sea, would apply.

B. Step Two: Did the Incident Take Place Inside a Space-Faring Object or Among Space-Faring Objects?

Once it is established that the conflict took place in Outer Space, the next question to ask is whether (1) it was an accident involving multiple space-faring objects, or (2) the conflict occurred inside a space-faring object.

1. Incidents Involving Multiple Space-Faring Objects

If the incident involves multiple objects in Outer Space, then the question on jurisdictional authority would turn on whether all space-faring objects involved are flagged under (a) one nation or (b) several nations.

a) One State-Party: That State's Jurisdictional Laws Control

As long as all of the objects involved in an incident are flagged under the same State, then that nation would have complete authority over the dispute resolution process. Since no other sovereignties' space-faring objects are involved, then there is no international concern. It is worth noting that the jurisdictional authority here does not turn on the nationalities of the parties involved. Similar to

128. *See supra* Section II.A.

129. *See supra* Section II.B.

visiting another country on Earth, by boarding a foreign-flagged spacecraft, these participants give their tacit consent to submit to such nation's authority within its territory (the spacecraft).

b) Multiple State-Parties: Establishment of an Outer Space Adjudication Commission

If the conflict involves space-faring objects flagged under different nations, the Space Liability Convention's procedures in establishing a jurisdictional authority would apply.¹³⁰ However, this Article would make one small modification so that the convention's procedures can be applied seamlessly to conflicts involving an odd number of nations. Similar to the procedures for the treaty's Claims Commission,¹³¹ after providing a certain amount of time for the parties to resolve the dispute on their own, this proposal calls for the establishment of an Outer Space Adjudication Commission. Each State involved will choose a Commission member and all parties will jointly pick the Commission's chairperson. However, unlike the Space Liability Convention, if there are an odd number of nations involved such that the final membership of the Commission (including the chairperson) will be even, then this proposal mandates the selection of a vice chairperson as well. If the parties cannot agree on the chairperson (or chairs) after a certain amount of time, the United Nations Secretary-General will make the selection. By majority vote—which will always be possible now that the membership is always odd—the Adjudication Commission will determine its rules, procedures, and governing law for the conflict.

2. Incidents Occurring in a Space-Faring Object

If the conflict took place inside a space-faring object, the jurisdictional authority analysis then turns on whether this object is flagged under one nation or under a collective of nations.

a) One State-Party: That State's Jurisdictional Laws Control

If the conflict takes place inside a space-faring object that is registered to a single nation, the jurisdictional question becomes simple to resolve. Under Article VIII of the Outer Space Treaty, the nation “on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body.”¹³²

130. Space Liability Convention, *supra* note 22, arts. XIV–XVI.

131. *Id.* art. XIV.

132. Outer Space Treaty, *supra* note 20, art. VIII.

Hence for conflict resolution purposes, jurisdictional authority will lie with the nation who registered such object.

b) Multiple State-Parties: Jointly-Executed Agreement or an Outer Space Adjudication Commission

However, if the incident took place in a space-faring object that is flagged under a collective of nations, then the governing agreement for such object should be used as the starting point to determine jurisdiction. These joint-operation agreements will typically have a conflict-resolution clause stipulating the jurisdictional procedures for these cases.¹³³

For example, activities onboard the International Space Station are governed by a 1998 intergovernmental agreement.¹³⁴ Article 5 of the agreement notes that, in accordance with the Outer Space Treaty, “each Partner shall retain jurisdiction and control over the elements it registers . . . and over personnel in or on the Space Station who are its nationals.”¹³⁵ Additionally, the agreement also contemplates the procedures required for criminal jurisdiction.¹³⁶ Therefore, this agreement clearly lays out the authority that should be empowered to resolve a particular incident onboard the space station—including the McClain case mentioned in the introduction.¹³⁷

But, in the unlikely event that there is no agreement in place or none of the provisions would cover the conflict in question, then further examination is needed. Here, the exact location where the incident took place must be identified. If the accident can be pinpointed to segment(s) owned by a specific nation, then this particular incident location can be treated as a separate space-faring object. Applying the earlier-stated rules,¹³⁸ the nation who registered such object will be empowered to resolve the conflict. If it is unclear who owns the segment(s) and/or

133. *See, e.g.*, Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, art. 5, Jan. 29, 1998, State Dep’t No. 01-52, 2001 WL 679938.

134. *Id.*

135. *Id.* art. 5, ¶ 2.

136. *See id.* art. 22.

137. Since the incident only involves an American astronaut, United States would have complete jurisdictional authority over the case. *See id.* art. 22, ¶ 1 (providing that parties “may exercise criminal jurisdiction over personnel in or on any flight element who are their respective nationals”).

138. *See supra* Section III.B.1.a.

the accident took place in segments owned by multiple nations, then the earlier-stated rules on the creation of an adjudication commission can be used.¹³⁹

IV. Case Studies: Application of the Jurisdictional Authority Framework

This Part uses several hypotheticals to help further clarify the jurisdictional framework established in Part III. All scenarios are presumed to have occurred in Outer Space, thereby bypassing the first step of the analysis.

A. Hypothetical No. 1: A Conflict Onboard a Spaceship

Situation: A conflict arises among passengers and crew of a spacecraft flagged under a single nation. People involved in this incident came from different countries, with some not having diplomatic relationships with others. Nobody onboard is a citizen of the nation the spacecraft is flagged under.

Because the conflict took place in a spacecraft flagged under a specific nation, that nation should have complete jurisdictional authority over the conflict.¹⁴⁰ Citizenship of the people involved is a red herring and does not factor into this determination.¹⁴¹ It also does not matter whether the nations involved, due to their citizens, do not have diplomatic relationships with one another; by boarding the spacecraft, those citizens voluntarily submit to the carrier's national rules.¹⁴²

B. Hypothetical No. 2: An Accident Onboard a Jointly-Operated Space Station

Situation: An accident involving crew members of different nationalities occurs on a segment of a large space station that is jointly operated by several nations.

Since the space station is jointly operated by several nations, the first task is to determine whether there is an underlying governing agreement that addresses the issue at hand.¹⁴³ If there is no agreement or if the agreement does not address this specific scenario, then the identity of the nation who registered the segment(s) involved in the accident should be determined.¹⁴⁴ If the accident can be reduced to segment(s) owned by one specific nation, then that nation would have

139. *See supra* Section III.B.1.b.

140. *See supra* Section III.B.2.a.

141. *See supra* Section III.B.2.a.

142. *See supra* Section III.B.1.a.

143. *See supra* Section III.B.2.b.

144. *See supra* Section I.D.

jurisdictional authority over the conflict.¹⁴⁵ If not, then an adjudication commission should be established to resolve the issue.¹⁴⁶

C. Hypothetical No. 3: An Incident Involving Two Individuals on a Spacewalk

Situation: While outside on a spacewalk, frustration between two individuals boils over and leads to physical injuries.

Because of the spacesuit, each individual could be considered as operating within a separate space-faring object flagged under that individual's country.¹⁴⁷ If both parties have the same nationality, then that State would have complete jurisdictional authority to resolve the conflict.¹⁴⁸ However, if the two individuals are citizens of different countries, then an adjudication commission should be formed with three members: one member selected by each individual's nation, and a chairperson jointly agreed to by both countries (or appointed by the Secretary-General of the United Nations if an agreement cannot be reached).¹⁴⁹ All jurisdictional authority shall vest in such commission.¹⁵⁰

D. Hypothetical No. 4: Three Objects Colliding in Outer Space

Situation: Two satellites, each from a separate nation, collide in Outer Space, leading to damages to both. One of these damaged satellites veers off course and bumps into a third State's satellite, leading to additional damages.

Here, an adjudication commission should be formed with five members.¹⁵¹ Each of the three countries involved will individually nominate a member and then jointly select a chairperson and vice-chairperson—making the membership odd.¹⁵² This five-member commission will have all jurisdictional authority over the accident.¹⁵³

145. *See supra* Section III.B.2.b.

146. *See supra* Section III.B.2.b.

147. *See supra* Section I.A.

148. *See supra* Section III.B.1.a.

149. *See supra* Section III.B.1.b.

150. *See supra* Section III.B.1.b.

151. *See supra* Section III.B.1.b.

152. *See supra* Section III.B.1.b.

153. *See supra* Section III.B.1.b.

V. Conclusion

Once the exclusive realm of governmental agencies, Outer Space is now attracting both established commercial entities and new innovative start-ups. These are the harbingers of the new Space Age. But in this latest era, the infusion of such multitudes of activities will inevitably lead to conflicts as this sector becomes increasingly crowded. While a set of international treaties have, so far, been able to manage disputes that have come up in Outer Space, they are not specific enough for these new challenges. Hence, the existing rules of the road for Outer Space will need to be adapted for the modern times.

This Article attempts to address this need. It begins by setting a new boundary for Outer Space by using existing perspectives and a concept from the Law of the Sea. Then, through the creation of a decision tree framework, this Article shows how the appropriate jurisdictional authority for a particular dispute in Outer Space can be determined through the facts and circumstances of the case.

While the analysis is reactionary by nature (i.e., it depends on the facts of the incident), these guidelines can be used to proactively think about how the jurisdictional issue might be resolved if a conflict were to arise. As the framework dynamically assigns governing authority by the circumstances of the case, it is compatible with the Outer Space Treaty's core principle that Outer Space is the domain of all humankind and "not subject to national appropriation."¹⁵⁴

Through this solution, some of the unknown risks associated with Outer Space activities can be removed—enabling parties to better understand the resulting dispute procedures that might arise. With more and more commercial entities and private individuals gearing up to participate in this heavenly realm, the goal of these rules is to ensure that conflicts in Outer Space could be, at least procedurally, solved through a uniform and consistent approach. It is this Article's hope that, with these reassurances, different nations and entities will continue to boldly explore Outer Space while feeling less constrained by legal uncertainties. With this predictability, dreamers, innovators, and explorers would have one fewer item to worry about as they continue their quests in unlocking secrets and deriving new benefits for humanity in this final frontier.

154. Outer Space Treaty, *supra* note 20, art. II.