Astronomical Arbitration: Why Amending the Liability Convention is the Best Step Forward for Interstellar Adjudication

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Introduction

The framework governing adjudication of accidents occurring in space has only been used once.[1] On January 24, 1978, the Soviet satellite "Cosmos 954" fell back to Earth after experiencing system malfunctions almost immediately following its launch on September 18, 1977.[2] Because of technological constraints, a nuclear reactor had to be used to power the satellite.[3] The Soviets determined that any dangerous nuclear material would burn up in the atmosphere in the event of a crash. However, they would turn out to be incorrect. When the Cosmos 954 ("Cosmos") eventually reentered the atmosphere in the skies above the Northwest Territories, Alberta, and Saskatchewan provinces in Canada, it burst apart, spewing radioactive material over a 370-mile-long area between Great Slave Lake and Baker Lake.[4]

The United States and Canada sprang into action to clean up the debris, but the two states would eventually clean up only 1 percent of the contamination created by the nuclear reactor.[5] It did not take very long for the neighboring nations to make a guess as to who was at fault when Cyrillic letters were found on some of the debris.[6] Canada first sent written questions to the

1. Göktuğ Karacalıoğlu, *Energy Resources for Space Missions*, SPACE SAFETY MAG. (Jan. 16, 2014), http://www.spacesafetymagazine.com/aerospace-engineering/nuclear-propulsion/energy-resources-space-missions/.

2. *The Nuclear Disaster of Kosmos 954*, HISTORIC WINGS (Jan. 24, 2013), http://fly.historicwings.com/2013/01/the-nuclear-disaster-of-kosmos-954/; *see also* GUS W. WEISS, CENT. INTELLIGENCE AGENCY, MEMORANDUM FOR DEPUTY DIRECTOR FOR ADMINISTRATION: THE LIFE AND DEATH OF KOSMOS 954 (1983).

3. WEISS, *supra* note 2, at 1.

4. *Id.*

5. *Id.* at 5.

6. *See* Jacky Bonnemains, *Cosmos 954 Downfalls – 2015*, ROBIN DES BOIS (Jan. 23, 2015), http://www.robindesbois.org/en/les-retombees-du-cosmos-954/.

Union of Soviet Socialist Republics ("U.S.S.R."), asking them to verify information about the reactor and the nuclear material used.[7] When the U.S.S.R. gave delayed and unhelpful responses, Canada, heavily relying on the Liability Convention, sent the U.S.S.R. a claim for the cost of the cleanup worth $6 million USD. Negotiations between the two nations ensued, and eventually they reached a settlement amount of $3 million CAD. This agreement was memorialized in the "Settlement of Claim between Canada and the Union of Soviet Socialist Republics for Damage Caused by 'Cosmos 954'".[8] This agreement was the first and only time two sovereign nations engaged in diplomacy under the Liability Convention to determine compensation for damage done by space objects.[9] While each side may not have gotten exactly what they wanted, negotiations between the U.S.S.R. and Canada regarding damages stemming from the Cosmos Incident went well and were generally viewed as a success.[10]

Ever since humanity first ventured into space, it has had methods for determining who should bear the blame when spacefaring missions go awry. Initially, the principles governing responsibility for international activities conducted in space were enumerated in Resolution 1962 (VIII).[11] However, as spacefaring technology became more sophisticated, the legal framework followed suit, with the United Nations creating instruments such as the "Outer Space Treaty" and the "Liability Convention" soon after Resolution 1962 (VIII) to clarify and expand states' responsibilities when it comes to space.[12] This framework created a permissive scheme that emphasized opening space to private enterprise while still incentivizing

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7. *Id.*

8. Protocol in Respect of the Claim for Damages Caused by the Satellite "Cosmos 954", Can.-U.S.S.R., Apr. 2, 1981, 1470 U.N.T.S. 24934 [hereinafter Cosmos 954 Settlement].

9. Karacalıoğlu, *supra* note 1.

10. *See* Alexander F. Cohen, *Cosmos 954 and the International Law of Satellite Accidents*, 10 YALE J. INT'L L. 78, 91 (1984).

11. F.G. von der Dunk, *The Origins of Authorisation: Article VI of the Outer Space Treaty and International Space Law*, *in* NATIONAL SPACE LEGISLATION IN EUROPE: ISSUES OF AUTHORISATION OF PRIVATE SPACE ACTIVITIES IN THE LIGHT OF DEVELOPMENTS IN EUROPEAN SPACE COOPERATION, 6 STUDIES IN SPACE LAW 3, 5 (Frans G. von der Dunk ed., 2011).

12. G.A. Res. 2222 (XXI), annex, Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Dec. 19, 1966); G.A. Res. 2777 (XXVI), annex, Convention on International Liability for Damage Caused by Space Objects (Nov. 29, 1971).

states to adequately regulate flights occurring under their "umbrella of responsibility."[13]

Today, the space industry is on the rise. In 2018, governments and private companies spent a record $415 billion USD on satellite related products like satellite-based entertainment, mapping, and weather forecasting.[14] Interestingly, 80 percent of that $415 billion USD was spent by private entities, like Elon Musk's SpaceX.[15] Companies like Morgan Stanley, Bank of America, and Goldman Sachs predict the space industry to reach a value of $1.1 trillion USD by 2040.[16] However, while spacefaring technology and industry have continued to grow, the framework for allocating liability for outer-space accidents has remained stagnant.[17] Importantly, the entities taking to the stars have changed as well, as private businesses in increasingly large numbers have joined governments in developing spacefaring programs.[18] As the environment surrounding spacefaring changes, the framework for allocating liability must change with it.

As the only instance in which two sovereign nations engaged in diplomacy under the Liability Convention, the Cosmos incident is an informative case study when it comes to evaluating frameworks for assigning liability in space. While the diplomacy stemming from the Cosmos incident was generally viewed as a success, spacefaring nations should seek to make sure a more aggressive framework is in place before space travel truly takes off.

Part One of this note will introduce the current framework to deal with issues of liability in space that have developed over the last sixty years. When possible, it will seek to present the reader with real-world examples, such as a discussion about the Cosmos 954 incident or information about the United States spaceflight licensing scheme, to give context into how the framework functions. Part Two will discuss and analyze various possible alternatives and modifications to the current legal

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13. von der Dunk, *supra* note 11, at 6.

14. Rachel Layne, *Space Case: Why Reaching for the Stars Could Soon be a $1 Trillion Industry*, CBS NEWS: MONEYWATCH (July 16, 2019, 7:34 AM), https://www.cbsnews.com/news/space-is-a-more-than-400-billion-market-and-getting-bigger/.

15. *Id.*

16. *Id.*

17. *Id.*

18. SPACE ANGELS, U.S. GOVERNMENT SUPPORT OF THE ENTREPRENEURIAL SPACE AGE 2 (2019).

framework, including whether we should implement a solution that resembles arbitration, or one more akin to a centralized court. Finally, the note will conclude with a recommendation for a modified framework in Part Three.

I. Background

The current framework regarding disputes in space is almost exclusively governed by United Nations (U.N.) instruments. Resolution 1962 (VIII) was the initial U.N. document that laid out aspirational goals for the colonization of space.[19] The Outer Space Treaty assigned responsibility to states for governmental and private activities in the exploration and usage of outer space.[20] The Liability Convention elaborated on the liability first assigned in the Outer Space Treaty while also creating a dispute resolution format to resolve issues of liability.[21]

Finally, this section will conclude with a discussion of the practical implications of the current framework as well as an example of the licensing regime that the United States currently uses. The discussion of the U.S. framework will serve as an example of how spacefaring states have constructed licensing frameworks as stipulated by the Outer Space Treaty and Liability Convention.

A. Resolution 1962 (VIII): Setting the Stage for Private Activity in Space

While the U.N. started considering the question of how to explore and utilize outer space in 1958 and created a permanent committee to address the question in 1959, the first substantial document on the matter was U.N. Resolution 1962 (VIII), signed on December 13, 1963.[22] Resolution 1962 (VIII) mainly laid out aspirational goals, but it also included a compromise between

19. *See generally* G.A. Res. 1962 (XVIII), Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space (Dec. 13, 1963).

20. *See generally* G.A. Res. 2222, *supra* note 12.

21. *See generally* G.A. Res. 2777, *supra* note 12.

22. von der Dunk, *supra* note 11, at 5; *see also* G.A. Res. 1348 (XIII), Question of the Peaceful Use of Outer Space, 5 (Dec. 13, 1958); G.A. Res. 1472 (XIV) A, International Cooperation in the Peaceful Uses of Outer Space, 5 (Dec. 12, 1959).

the United States and the Soviet Union stating that the only way that private entities could operate in space was if they were under the "umbrella of a state's responsibility."[23]

This compromise resulted from the reality that the Soviet Union was opposed to private entities having a role in space at all, while the United States wanted to allow private entities to innovate in the area.[24] To this end, Resolution 1962 (VIII) stated that "[s]tates bear international responsibility for national activities in outer space, whether carried on by governmental agencies or by non-governmental entities."[25] Additionally, it required "authorization and continuing supervision by the State concerned" for "activities of non-governmental entities in outer space".[26] Resolution 1962 (VIII) created a compromise where private companies could operate in space only if they were under a state's authorization and supervision. This compromise would steer the direction of future space treaties.

B. The International Community Assigns Liability and Creates the Power to Minimize It with the Outer Space Treaty

Four years after Resolution 1962 (VIII) was signed, the spacefaring nations would enumerate many of the same principles into the Outer Space Treaty.[27] While the Outer Space Treaty created more specific rules and principles governing the exploration of space, the main advancement of the Outer Space Treaty from Resolution 1962 (VIII) was the formalization of a treaty. Article VI of the Outer Space Treaty states that "States Parties to the Treaty shall bear international responsibility for national activities in outer space . . . whether such activities are carried on by governmental agencies or by non-governmental entities", and Article VII places liability on states for damage caused by objects they have launched into outer space.[28] While there has since been discussion on what some of the terms within the Outer Space Treaty mean, the general purpose was to give states authorization power over private entities within their

23. von der Dunk, *supra* note 11, at 6.
24. *Id.* at 2.
25. G.A. Res. 1962, *supra* note 19, ¶5.
26. *Id.*
27. von der Dunk, *supra* note 11, at 7.
28. G.A. Res. 2222, *supra* note 12, at art. VII; von der Dunk, *supra* note 11, at 9.

jurisdiction, with the hope that states would use said power to limit their own exposure to liability.[29]

C. The International Community builds off the Outer Space Treaty with the Liability Convention.

The Liability Convention of 1972 was the last piece of the puzzle necessary to establish the current regime of international space liability (at least as far as this note is concerned).[30] Its primary purpose was to elaborate on the concept of a state's liability for objects it launched into space (called "space objects").[31] More specifically, the Liability Convention added a dual regime of liability to the Outer Space Treaty. If the space object at issue caused damage on the surface of the Earth (or an aircraft in flight), the launching State "[was] absolutely liable to pay compensation for damage caused by its space object . . . ."[32] This created a type of absolute liability with the only exception being cases where the damaged party was shown to have provoked the damage.[33] On the other hand, if the damage occurred in outer space, the launching state was only liable to the extent that the damage was its "fault."[34] The Liability Convention defined "damage" as "loss of life, personal injury, or other impairment of health; or loss of or damage to property of States or of person, natural or juridical, or property of international intergovernmental organizations[.]"[35] This definition was what Canada used when trying to assert damages under the Liability Convention.[36]

Finally, the Liability Convention also set out the closest analogue to a dispute resolution procedure seen in the existing

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29. von der Dunk, *supra* note 11, at 21; *see also* Bin Cheng, *The Commercial Development of Space: The Need for New Treaties*, 19 J. SPACE L. 17, 36 (1991) (discussing different views of what constitute "national activities").

30. Institute for Research on Intercultural Cooperation, *Space Law Revisited: The Regime of International Liability in Space*, MEDIUM (Apr. 27, 2017), https://medium.com/law-and-policy/space-law-revisited-the-regime-of-international-liability-in-space-66a864fa5157.

31. *Id.*

32. G.A. Res. 2777, *supra* note 12, at art. II.

33. *Id.* at art. VI.

34. *Id.* at art. III.

35. *Id.* at art. I.

36. *Claim Against the Union of Soviet Socialist Republics for Damage Caused by Soviet Cosmos 954*, 18 INT'L LEGAL MATERIALS 899, 905 (1979) [hereinafter *Canadian Claim*].

body of space law. Article IX of the Liability Convention dictates that claims for redress first need to be brought via diplomatic channels.[37] If the dispute was not able to be resolved diplomatically within one year of the claim being filed, either party could request that a claims commission be created through the U.N. to settle the dispute.[38] Claims commissions are usually comprised of three representatives.[39] Each party chooses one representative, and then a "chairman" is chosen jointly by the two parties.[40] The three representatives then recommend an amount of damages, decided by a majority vote, to be paid to the claimant.[41] The representatives can also decide the rules as to how the two parties can present evidence and witnesses, and the award of damages is only binding if the parties agreed to be bound before starting the process.[42] Finally, the representatives must publish a rationale for their decision once the process is complete.[43]

The Liability Convention is the treaty under which Canada attempted to recover damages from the U.S.S.R. in the wake of the Cosmos 954 Incident (in addition to other general principles of international law).[44] While this is the only time any member state has invoked the Liability Convention, Canada and the U.S.S.R. set important precedent related to the interpretation of "injury" during the course of their negotiations.[45] First, the Liability Convention requirement that states seek a diplomatic solution served its purpose in the Cosmos negotiations. The States never reached the claims commission stage, and the requirement that they wait one year before requesting a claims commission spurred the Soviets to respond to the Canadian claim, even if they did drag their feet at first.[46] Second, Canada issued a statement of claim under the Liability Convention and both States issued a statement settling the incident, even

37. G.A. Res. 2777, *supra* note 12, at art. IX.
38. *Id.* at art. XIV.
39. *Id.* at art. XV.
40. *Id.*
41. *Id.* at art. XVI, XVIII.
42. *Id.* at art. XIX.
43. *Id.*
44. *Canadian Claim*, *supra* note 36, at 899; *see also* Joseph A. Burke, *Convention on International Liability for Damage Caused by Space Objects: Definition and Determination of Damages After the Cosmos 954 Incident*, 8 FORDHAM INT'L L. J. 255, 274 (1984).
45. *See* Karacalıoğlu, *supra* note 1; Cohen, *supra* note 10, at 89 n.72.
46. *See* Burke, *supra* note 44, at 279.

though the Liability Convention did not require that they do so if the claim was settled during the diplomacy stage.[47] This was important because in settling Canada's claim, the Soviets were tacitly acknowledging the legitimacy of bringing claims under the Liability Convention, as well as their responsibility to Canada for the Cosmos 954 crash.[48] Initially, there was fear that Canada would not be able to recover at all under the Liability Convention's definition of "damage" because there was no loss of life, and damage to property was unmeasurable.[49] However, with the determination that Canada should be compensated for mitigation of damage under the Liability Convention, the U.S.S.R. and Canada may have bolstered the case for a more permissive reading of the Liability Convention definition of damages.[50]

D. Practical Effects of the Outer Space Treaty and Liability Convention

The Outer Space Treaty and Liability Convention are not self-executing treaties.[51] In *Medellin v. Texas*, the Supreme Court explained that, while treaties constitute international commitments, they are not binding domestic law unless Congress enacts statutes implementing them or "the treaty itself conveys an intention that it be 'self-executing.'"[52] The Outer Space Treaty and Liability Convention do not actually impose any requirements on their signatories apart from attributing

47. *See generally* Cosmos 954 Settlement, *supra* note 8; G.A. Res. 2777, *supra* note 12.

48. *See* Cohen, *supra* note 10, at 89 n.72; Burke, *supra* note 44, at 280; *see also* Bryan Schwartz & Mark L. Berlin, *After the Fall: An Analysis of Canadian Legal Claims for Damage Caused by Cosmos 954*, 27 MCGILL L.J. 676, 705–07 (citing BORIS BELITSKY, INTERNATIONAL SPACE LAW 62 (A. Piradov ed., 1976)) (stating that Soviet jurisprudence favors treaty law over international customary law).

49. Burke, *supra* note 44, at 276 n.98.

50. *Id.* at 280 n.116 (stating that the settlement may have created a practice where a launching state will compensate other states that have suffered damage caused by space objects); Cohen, *supra* note 10, at 91.

51. *Reopening the American Frontier: Exploring How the Outer Space Treaty Will Impact American Commerce and Settlement in Space: Hearing Before the Subcomm. on Space, Sci., & Competitiveness of the S. Comm. on Commerce, Sci., & Transp.*, 115th Cong. 15 (2017) [hereinafter *Reopening the American Frontier*] (statement of James E. Dunstan, Founder, Mobius Legal Group, PLLC); Medellin v. Texas, 552 U.S. 491, 504–05 (2008).

52. *Medellin*, 552 U.S. at 505.

liability in the case of an accident.[53] The attribution of liability for national activities by the countries themselves or private entities under their umbrella was meant to encourage signatories to exercise their authorization power to only authorize missions least likely to incur liability.[54] States like the U.S.S.R. hoped that this liability attribution scheme would dissuade states from allowing private enterprises to operate in space at all.[55] On the other hand, the U.S. Congress would eventually enact statutes implementing the Liability Convention in the form of a licensing scheme facilitated by the Federal Aviation Administration ("FAA").[56]

E. Current Framework for Licensing of United States Space Missions

Currently, the U.S. Department of Transportation (specifically the FAA) is responsible for licensing commercial space launch activities and reentry.[57] The licensing requirements, as well as any subsequent insurance requirements are intended to assist the U.S. in meeting its obligations under the Outer Space Treaty.[58] The licensing process consists of pre-approval elements such as payload, financial, and safety review as well as post-issuance steps like compliance monitoring.[59] Furthermore, federal law also indemnifies private space companies from liability caused to third parties so long as they meet a statutorily mandated insurance requirement.[60] Currently, private companies are

53. *Reopening the American Frontier*, *supra* note 51, at 18.

54. *Id.*

55. von der Dunk, *supra* note 11, at 1.

56. Paul Stephan Dempsey, *State Regulation of Space Activities: An Overview – The License as a Prerequisite to Space Operations: Jurisdictional Limitations*, *in* 3 SPACE L. 9A:4 (2020).

57. 51 U.S.C. § 50905 (2020); *id.*

58. FED. AVIATION ADMIN., LIABILITY RISK-SHARING REGIME FOR U.S. COMMERCIAL SPACE TRANSPORTATION: STUDY AND ANALYSIS 6-4 (2002) [hereinafter FAA STUDY].

59. *Launch or Reentry Vehicles*, FED. AVIATION ADMIN. (June 27, 2016, 2:32:10 PM), https://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/launch_reentry/.

60. 51 U.S.C. § 50915(a); 51 U.S.C. § 50914 (providing that states can also self-insure if they can demonstrate "financial responsibility in amounts to compensate for the maximum probable loss from claims"); Jeff Foust, *Congress Launches Commercial Space Legislation*, SPACE REV. (May 26, 2015),

required to be insured up to the maximum probable loss as determined by the Department of Transportation after consultation with NASA, the Air Force, as well as any other appropriate executive agencies.[61] This indemnification does not protect parties from their own gross negligence.[62] In the case of a catastrophic event where the United States is responsible for damages caused by a private entity under the Outer Space Treaty, the insurance purchased by the private entity will hopefully cover the entirety of the damages.[63] If damages exceed the insured amount, the licensee will still be liable up to a statutory ceiling ($500,000,000 USD).[64] Finally, if damages still exceed the statutory ceiling, the United States Government will pay for the remainder up to $1,500,000,000, upon which the licensee again becomes liable.[65]

F. Issues Moving Forward

While the current liability sharing regime has yet to run into any real difficulties, it is unclear whether it would be sufficient were accidents in outer space to occur more frequently. The Federal Aviation Administration asserts that its current most probable loss calculations would result in damages exceeding the insurance requirements only once every 10,000,000 launches.[66] However, in a 2017 report, the United States Government Accountability Office found that the Federal Aviation Administration's 1988 figure of $3,000,000 USD may have been an outdated valuation for a human life.[67] This outdated valuation could mean that the United States government is more exposed to liability under the current risk sharing regime than it presently anticipates.[68]

The insurance industry is also still finding its footing in

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https://www.thespacereview.com/article/2759/1.

61. FAA STUDY, *supra* note 58, at ES-2.

62. Martin Marietta Corp. v. Int'l Telecomms. Satellite Org., 991 F.2d 94, 99–100 (4th Cir. 1992).

63. *See* FAA STUDY, *supra* note 58, at 6-6–6-7.

64. *Id.* at 6-5.

65. *Id.*; *see also* 14 C.F.R. § 440.19 (2020) (empowering the United States to provide for payment up to $1,500,000,000).

66. FAA STUDY, *supra* note 58, at 9-11.

67. U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-17-366, COMMERCIAL SPACE LAUNCH INSURANCE: WEAKNESS IN FAA'S INSURANCE CALCULATION MAY EXPOSE THE FEDERAL GOVERNMENT TO EXCESS RISK 7 (2017).

68. *Id.*

insuring space missions. While space launch failures have been steadily declining since spaceflight started in the late 1950's, insuring launches is still a complicated proposition.[69] In recent years, insurers have struggled to turn a profit in space launch insurance due to a combination of low premiums and high claims.[70] While space launch insurance was fairly expensive in 2003, by 2018, premiums had dropped significantly thanks to excess capacity in the market.[71] However, the space insurance market is cyclical, and launch failures tend to be followed by large swings in insurance premiums, which could in turn pressure companies to forgo insurance altogether and self-insure under the federal framework, a financial decision that could be ruinous for all but the largest companies.[72] Compounding this problem is the fact that space launches are relatively infrequent, and insurance companies need larger samples to be confident in their pricing models.[73]

Another issue that could foreseeably arise in the future is that states are unable to agree on a damage amount, forcing victims of space accidents to go uncompensated. While Canada and the U.S.S.R. were able to come to an agreement, the Liability Convention does not require binding adjudication, so states can refuse to engage in diplomacy and not abide by claims commission judgments if they so choose.[74] Coming up with a predictable and efficient method of resolving these disputes to the satisfaction (or at least acceptance) of both parties is important for a peaceful coexistence in space. The following section will discuss and analyze some solutions already proposed by academics.

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69. *See* Sissi Cao, *A Closer Look at Rocket Insurance, a Peculiar Branch of the Space Industry*, OBSERVER (Sept. 20, 2019, 7:30 AM), https://observer.com/2019/09/space-insurance-rocket-satellite-industry-analysis/; Ed Kyle, *Orbital Launch Summary by Year*, SPACE LAUNCH REP., http://spacelaunchreport.com/logyear.html (last updated Dec. 31, 2019).

70. Cao, *supra* note 69; Jeff Foust, *Space Insurance Rates Increasing as Insurers Review Their Place in the Market*, SPACENEWS (Sept. 14, 2019), https://spacenews.com/space-insurance-rates-increasing-as-insurers-review-their-place-in-the-market/.

71. *Id.*

72. Cao, *supra* note 69; *see also* SELECT COMMITTEE OF THE UNITED STATES HOUSE OF REPRESENTATIVES, THE COMMERCIAL SPACE INSURANCE INDUSTRY 301 (1998).

73. Cao, *supra* note 69; Kyle, *supra* note 69.

74. G.A. Res. 2777, *supra* note 12.

II. Analysis

Making sure licensing and risk management procedures are in place for each individual signatory of the Outer Space Treaty should not be the stopping point for creating an effective liability adjudication framework in space. An effective dispute resolution procedure also needs to be in place to ensure States are on the same page and are able to continue to work together to colonize outer space.[75] Ideally this dispute resolution procedure would be created via amendments to the existing body of U.N. treaties, since withdrawal from said treaties would likely be met with backlash from other signatories.[76] One of the flashpoints in the argument as to what amendments need to be made is whether claims should be adjudicated in a formal court or in a venue that more closely resembles arbitration or some other form of alternative dispute resolution.[77]

A. Centralized Court System

In *First Contact: Establishing Jurisdiction Over Activities in Space,* Brian Abrams argues in favor of creating a centralized court to adjudicate space related suits.[78] It would add on to the current framework under the Outer Space Treaty and Liability Convention in that it would allow private entities to sue governments (and each other) for torts and other issues that take place in outer space.[79] This is a departure from the current practice under the Outer Space Treaty and Liability Convention, which requires governments of the injured party to act on behalf of injured private parties in order to recover damages.[80]

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75. *See generally* Johnathan F. Galloway, *Cooperation, Conflict, and Competition in Space Law*, 46 PROC. ON L. OUTER SPACE 2 (2003) (positing that states working to colonize outer space should seek to resolve conflict in a way where everyone benefits in order to create and maintain a cooperative and collaborative environment in space).

76. *See generally Reopening the American Frontier*, *supra* note 51, at 11 (statement of Michael J. Listner, Founder, Space Law and Policy Solutions) (discussing the potential effects of withdrawal).

77. *See* Ka Fei Wong, *Collaboration in the Exploration of Outer Space: Using ADR to Resolve Conflicts in Space*, 7 CARDOZO J. CONFLICT RESOL. 445 (2006) (advocating for an ADR dispute resolution format). *But see* Brian Abrams, *First Contact: Establishing Jurisdiction over Activities in Outer Space*, 42 GA. J. INT'L & COMP. L. 797 (2014) (advocating for a centralized court format).

78. Abrams, *supra* note 75.

79. *See id.* at 820–21.

80. *See id.*

Having a centralized court framework for resolving disputes arising from accidents in outer space is a bold idea that would solve many issues currently existing with Space Law. A centralized court would likely be more independent than an arbitral institution, since judges could be selected by signatories instead of by the parties to the dispute.[81] A centralized court would also solve the issue of what choice of law to use for outer space disputes, since any centralized international court would likely apply international law.[82] In a similar vein, a centralized court would be able to create case law through its adjudications.[83] This would be especially beneficial from the perspective of developing space law because, currently, there is not a clear consensus on what certain terms in the Outer Space Treaty and Liability Convention even mean.[84] Finally, a centralized court would increase predictability and efficiency because potential defendants would know that they could only be sued in one court and plan accordingly.[85]

B. Alternative Dispute Resolution Format

Proponents of an alternative dispute resolution system, like George Khoukaz and Ka Fei Wong, believe that some sort of arbitration or mediation system to resolve disputes under the Outer Space Treaty is the most sensible solution to create buy-in while still actually resolving disputes.[86] Such an arbitral system could follow the framework already laid out in agreements like the Convention on the Recognition and Enforcement of Foreign Arbitral Awards, which requires the signatory states to enforce an arbitral award made in another

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81. *Id.* at 821.

82. *Id.*

83. *Id.*

84. *See, e.g.*, Cohen, *supra* note 10, at 89 n.72 (during the Cosmos incident, the Soviets accepted that they had caused "damage" under the Liability Convention even though there was no real precedent that defined what "damage" even meant).

85. Abrams, *supra* note 75, at 821; *see also* Asahi Metal Indus. Co. v. Superior Ct. of Cal., 480 U.S. 102, 110 (1987) (citation omitted) (quoting Hanson v. Denckla, 357 U.S. 235, 253 (1958)) ("When a corporation 'purposefully avails itself of the privilege of conducting activities within the forum State,' it has clear notice that it is subject to suit there, and can act to alleviate the risk of burdensome litigation by procuring insurance . . . .").

86. *See generally* George Khoukaz, *ADR That Is out of This World: A Regime for the Resolution of Outer-Space Disputes*, 2018 J. DISP. RESOL. 265; Wong, *supra* note 75 (advocating for an alternative dispute resolution format).

signatory state.[87] Furthermore, this method of dispute resolution could use existing institutions like the Permanent Court of Arbitration, or, if the signatories desired, could create an entirely new body to deal solely with space related disputes.[88] It could also utilize a multi-tiered approach, such as beginning with mediation and only transitioning into arbitration if the parties could not come to an agreement.[89]

Additionally, many of the benefits that a centralized court system could theoretically provide might also be provided in an alternative dispute resolution format. First of all, while a centralized court would provide a predictable venue for claimants to sue and defendants to be sued for outer space torts, the present reality may already make claims under the Liability Convention the most likely scenario simply because of the drawbacks of suing anywhere else.[90] A state bringing a damages claim is more likely to bring it under the Liability Convention than in a tribunal of the state against which they are asserting the claim because of fear of bias and choice of law concerns.[91] Individuals may choose to lobby their state to pursue damages under the Liability Convention in lieu of filing claims themselves because of financial limitations or statutory limitations on what sort of tort claims can be pursued against sovereign nations.[92]

Furthermore, a centralized court system is not the only adjudicative format that could make precedent through its rulings. Under the Liability Convention, a claims commission is required to publish a report detailing its reasoning on why it decided on a particular amount of damages.[93] A future method of adjudicating disputes in outer space could require similar reports and encourage that prior decisions be used as guidelines in future disputes, similar to what the U.S.S.R. and Canada did with the definition of "damages" under the Liability

87. Khoukaz, *supra* note 84, at 278. *See generally* Convention on the Recognition and Enforcement of Foreign Arbitral Awards, June 10, 1958, 33 U.N.T.S. 3.

88. *See* Khoukaz, *supra* note 84, at 276.

89. *Id.* at 279; *see also* G.A. Res. 2777, *supra* note 12, at art. XIV (requiring diplomatic negotiations for one year before creation of a claims commission was allowed).

90. *See* Wong, *supra* note 75, at 452–53.

91. *Id.*

92. Abrams, *supra* note 75, at 819, 822–23; *see also* Federal Tort Claims Act, 28 U.S.C. §§ 2671–2680 (2018).

93. G.A. Res. 2777, *supra* note 12, at art. XIX .

Convention.[94]

An alternative dispute resolution format would have unique benefits as well. First of all, alternative dispute resolution tends to be more cooperative and collaborative than litigation, which would benefit colonization of outer space, where the law should encourage cooperation between the various relevant actors.[95] This would be especially true if the Liability Convention requirement that claimants first try to resolve matters through diplomacy is retained.[96] An alternative dispute resolution format would also decrease time spent adjudicating each claim.[97] This would be important in the space industry, where court battles could impede the progress of enterprise by necessitating lengthy and expensive litigation, as well as by creating uncertainty by putting disputes over things like intellectual property in limbo for extended periods of time.[98] Another good argument for an alternative dispute resolution model is that it would have the benefit of familiarity. The negotiations around the Cosmos incident were generally viewed as a success, and states seem willing to cooperate under the Liability Convention framework.[99] Making incremental changes to an already existing dispute resolution regime would likely be easier and more widely accepted than tearing everything down to put a central court system in place.[100]

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94. *See* Cohen, *supra* note 10, at 89 n.72 (during the Cosmos incident, the Soviets accepted that they had caused "damage" under the Liability Convention even though there was no real precedent that defined what "damage" even meant); Wong, *supra* note 75, at 461..

95. *See* Galloway, *supra* note 75, at 2 ("It is clear that if one major player in a game is committed to cooperation there is going to be a lot of cooperation as there has been in law and in programs.").

96. *See* Wong, *supra* note 75, at 462–63.

97. Miriam R. Arfin, *The Benefits of Alternative Dispute Resolution in Intellectual Property Disputes*, 17 HASTINGS COMM. & ENT. L.J. 893, 899 (1995).

98. *See* Wong, *supra* note 75, at 466.

99. *See* Burke, *supra* note 44, at 279 ("On April 2, 1981, a protocol was signed between the Government of Canada and the Government of the Soviet Union stating that the Soviets would pay, and Canada would accept Can.$3 million in full settlement of the claim and all matters arising out of the crash of the Soviet satellite."); Cohen, *supra* note 10, at 89 n.72 ("It is not clear that the radioactive remains of Cosmos 954 injured Canada under the Liability Convention's definition of injury . . . Canadian elites were relieved that the U.S.S.R. chose not to avoid payment on these grounds.").

100. *See Reopening the American Frontier*, *supra* note 51, at 6–7 (statement of Christopher Johnson and Ian Christensen, Secure World Foundation) ("We strongly believe that continuing to support the Outer Space Treaty and further enhancing U.S. national oversight frameworks will be the best method for promoting commercial development in space.").

That is not to say that an alternative dispute resolution system will not have flaws. The main issue is, if the alternative dispute resolution system stipulated by the Liability Convention is left intact without any changes, it will only be binding if both parties to the dispute agree to make it so.[101] If parties can simply choose not to be bound, states may be reticent to engage in these dispute resolution proceedings at all.[102] If, at the end of the day, the opposing party can simply choose not to honor the decision, many parties will simply choose not to spend the time and money arbitrating in the first place.[103] Additionally, while arbitrators can be encouraged to look to past decisions for guidance, binding substantive law currently cannot be created via adjudication.[104]

C. The Question of Buy-In

An issue for both of these proposals is the question of buy-in. For a central court to have legitimacy, it would likely have to have buy-in from significant spacefaring countries like the United States.[105] Given the fact that supporting a centralized court would mean giving up much of its agency over any disputes arising from its own actions in outer space, this option is likely a non-starter for this reason alone. Indeed, the United States has a long history of refusing to submit to the jurisdiction of international courts.[106]

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101. G.A. Res. 2777, *supra* note 12, at art. XIX ("The decision of the Commission shall be final and binding if the parties have so agreed; otherwise the Commission shall render a final and recommendatory award, which the parties shall consider in good faith.").

102. Wong, *supra* note 75, at 461.

103. *Id.*

104. *See id.* at 467–68.

105. *See generally* James F. Alexander, *The International Criminal Court and the Prevention of Atrocities: Predicting the Court's Impact*, 54 VILL. L. REV. 1, 8 n.27 (2009) ("The ICC's potential to prevent atrocities may be partially a function of the support it does or does not receive from powerful states like the United States."); Amanda Shendruk et al., *Funding the United Nations: What Impact Do U.S. Contributions Have on UN Agencies and Programs?*, COUNCIL ON FOREIGN REL. (June 8, 2020), https://www.cfr.org/article/funding-united-nations-what-impact-do-us-contributions-have-un-agencies-and-programs (discussing how the U.S. is the largest donor to the U.N.).

106. *See, e.g.*, Robert C. Johansen, *The Impact of U.S. Policy Toward the International Criminal Court on the Prevention of Genocide, War Crimes, and Crimes Against Humanity*, 28 HUM. RTS. Q. 301, 308 n.27 (2006); *see* Alexander, *supra* note **Error! Bookmark not defined.** ("Several commentators have argued that the lack of U.S. support, in particular, undermines the court's

An alternative dispute resolution format might have more luck since parties to the dispute have agency over who presides over the arbitration.[107] Additionally, states have already assented to a type of alternative dispute resolution by ratifying the Liability Convention.[108] However, any amendments to the Liability Convention must be ratified by a majority of signatories, which currently stands at 55 states.[109] Building this amount of consensus might be difficult. Additionally, broaching the issue of amending the Liability Convention could prompt other states to bring up their own issues with the Liability Convention or other United Nations treaties dealing with space.[110]

D. Additional Considerations

One avenue that has been proposed by Helen Shin to solve the buy-in issue is to require that states submit to a binding arbitration agreement as a prerequisite to being allowed to operate on a multinational space station (MSS).[111] Hopefully the negative consequence of losing the economies of scale gained via cooperation with other nations would be enough of a "stick" to convince states to accept such an agreement. Furthermore, in the scenario where a state refused to sign such an agreement, its private citizens could sign contracts individually granting them

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effectiveness."); Letter from George Shultz, U.S. Sec'y of State, to Dr. Javier Perez de Cuellar, U.N. Sec'y-General (Oct. 7, 1985), *reprinted in* 24 I.L.M. 1742 (1985) (stating that the United States is terminating its acceptance of compulsory jurisdiction of the International Court of Justice); Lotta Vikari, *Towards More Effective Settlement of Disputes in the Space Sector*, 1 LAPLAND L. REV. 226, 241 (2011) ("Even if a special space disputes chamber of the ICJ were established, there is no particular reason to expect a considerable number of disputes (if any) from the space sector to be presented to the ICJ.").

107. *See* Helen Shin, *"Oh, I Have Slipped the Surly Bonds of Earth": Multinational Space Stations and Choice of Law*, 78 CALIF. 1375, 1413 (1990) (stating that arbitration is less likely to engender questions of sovereignty because the participants are vesting the panels with authority).

108. *See* Comm. on the Peaceful Uses of Outer Space, *Status of International Agreements Relating to Activities in Outer Space as at 1 January 2019*, U.N. Doc. A/AC.105/C.2/2019/CRP.3 (Apr. 1, 2019) (stating that 96 states have currently ratified the Liability Convention while an additional 19 states have signed).

109. *See id.*; G.A. Res. 2777, *supra* note 12, at art. XXV.

110. *Reopening the American Frontier*, *supra* note 51, at 6 (statement of Christopher Johnson and Ian Christensen, Secure World Foundation).

111. Shin, *supra* note 105, at 1413.

the same privileges and binding them in a similar manner.[112]

Rachel Rogers has proposed helping build buy-in by implementing a limitation on liability similar to the limitations found in maritime law.[113] Traditionally, maritime law has limited the amount of liability placed on parties at fault to prevent inordinate unforeseen damage awards.[114] In the U.S., this principle was first enumerated in the Limitation of Liability Act of 1851 ("Limitation of Liability Act")[115] While the Limitation of Liability Act applies to United States jurisdictions, many other countries have similar laws in place.[116] The Convention on Limitation of Liability for Maritime Claims (the "1976 Convention") enumerated these principles at an international level.[117] The 1976 Convention places certain limitations on who is able to sue for a maritime accident, as well as certain limitations on how much they can assert in damages, usually based on factors like the weight of the ship or amount of lives lost.[118] The idea when the 1976 Convention was implemented was that, by limiting liability, the signatories were lowering the barriers of entry to the industry and increasing commerce.[119]

The hope behind this proposal is that by placing the space industry within a similar framework, industry and investment would be encouraged in a similar manner.[120] Spacefaring states could limit vessels' amount of liability using criteria like payload, passengers, or weight.[121] Space missions could then be insured up to the liability cap, similar to how the United States requires their spaceflights be insured up to the maximum probable loss.[122] Such a limitation would have the benefit of increasing certainty and predictability among private enterprises operating in space, which would be beneficial for the

112. *Id.*

113. *See generally* Rachel Rogers, *The Sea of the Universe: How Maritime Law's Limitation on Liability Gets It Right, and Why Space Law Should Follow by Example*, 26 IND. J. GLOB. LEGAL STUD. 741 (2019).

114. *Id.* at 749.

115. 46 U.S.C. app. § 183 (2000).

116. Rogers, *supra* note 111, at 749–50.

117. *Id.* at 749.

118. *Id.* at 750.

119. *Id.* at 754.

120. *Id.* at 756.

121. *Id.* at 750 (stating that liability cap changes with size and shape of ships).

122. FAA STUDY, *supra* note 58, at ES-2.

space industry as a whole. Additionally, the knowledge that there would always be a cap on damages may provide the peace of mind necessary to get more states on board with accepting a binding arbitration framework.[123]

In the scenario where concessions like caps on liability and requirements like agreement to arbitration as a prerequisite for participation in joint ventures do not move the needle, states can still attempt to affect change through example and non-binding resolutions.[124] There is already a history of this practice in the area of space law.[125] For example, in 1995, NASA published a set of orbital debris mitigation guide lines designed to mitigate the amount of debris created in space.[126] Other countries followed, issuing their own guidelines.[127] Finally, in 2008, a set of debris mitigation principles was endorsed by the United Nations.[128] If an amendment to the Liability Convention is not feasible, states could attempt to change the framework by leading by example and letting the results speak for themselves.[129]

E. Carrot and Stick Arbitration: Making it Worth Their While to Arbitrate

States should use an alternative dispute resolution format to resolve future disputes in space. The current framework under the Liability Convention, with its diplomatic approach and claims commission requirements is a good place to start.[130] Keeping these parts of the Liability Convention in place would foster international cooperation and allow states to build off the success of the Cosmos negotiations.[131] Additionally, allowing

123. *See* Rogers, *supra* note 111, at 754.

124. *See* P.J. Blount, *Renovating Space: The Future of International Space Law*, 40 DENV. J. INT'L L. & POL'Y 515, 525 (2011) (arguing that "soft law" agreements are easier to achieve than "hard legalization").

125. *Id.*

126. *Debris Mitigation*, NASA, https://orbitaldebris.jsc.nasa.gov/mitigation/ (last visited Oct. 2, 2020); *Space Debris Mitigation*, SPACE SAFETY MAG., http://www.spacesafetymagazine.com/space-debris/mitigation/ (last visited Oct. 2, 2020).

127. *Space Debris Mitigation*, *supra* note 124.

128. G.A. Res. 62/217, International Cooperation in the Peaceful Uses of Outer Space, at 2 (Feb. 1, 2008).

129. *See Reopening the American Frontier*, *supra* note 51, at 6 (statement of Christopher Johnson and Ian Christensen, Secure World Foundation).

130. G.A. Res. 2777, *supra* note 12, at art. XIV, XV.

131. *See* Khoukaz, *supra* note 84, at 276.

both states to have equity in the construction of the claims commission makes it more likely that they will view the mediator as non-biased and accept the eventual judgment.[132]

While the Cosmos Incident demonstrated that the current framework appears to work well, it still has issues that could be alleviated with some key amendments. First, all arbitrations should be binding unless both parties agree to opt out.[133] Second, rulings from all adjudications should be written in detail with an explanation for the decision, be released to the public, and be viewed as highly persuasive in order to create predictability from adjudication to adjudication.[134] These two changes will serve to make the arbitration procedure more predictable and worthwhile going into the future while keeping in place all of the benefits that make arbitration an attractive option in the first place.

Another change that should be made to foster buy in and encourage payment of judgment is to require states to agree to the arbitration framework before they are allowed to work with arbitration states on any outer space related project, such as a multinational space station.[135] In a similar vein, states could require private companies to agree to binding arbitration before allowing them to fly under their "umbrella of protection".[136] Pursuing this route would necessitate that large spacefaring nations like Russia and the United States be party to the arbitration framework so that there is substantial incentive to agreement.[137] Additionally, for states that have agreed to be bound by arbitration but are threatening to refuse to pay judgment, removal from joint ventures with other spacefaring nations provides a tangible penalty to dissuade non-payment. Adding this requirement would send a clear message to new space faring states that they have to play by the rules or be left out in the cold.

Finally, states should consider implementing a cap on

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132. G.A. Res. 2777, *supra* note 12, at art. XIV, XV.

133. Wong, *supra* note 75, at 470.

134. *Id.* at 470–71.

135. Shin, *supra* note 105, at 1413.

136. *See* Henry R. Hertzfeld & Timothy G. Nelson, *Binding Arbitration as an Effective Means of Dispute Settlement for Accidents in Outer Space*, 2013 PROC. INT'L INST. SPACE L. 129.

137. *See generally* Alexander, *supra* note 103, at 8 n.27 ("The ICC's potential to prevent atrocities may be partially a function of the support it does or does not receive from powerful states like the United States.").

liability like the one that exists in maritime law.[138] This would increase predictability and encourage growth in the space industry as a whole.[139] Conversely, introducing a cap on liability would also have the benefit of pushing states towards accepting the arbitration framework since submitting to binding arbitration would likely be much easier when states know what the limit of that liability would be.

The United States in particular should be one of the states pushing hardest for a cap on liability since it is already using a cap on liability through its registration framework.[140] This would be a chance for the United States to influence space law by example.[141] In advocating for a limited liability framework, the United States could point to the legwork it has already done in calculating maximum probable loss and present testimony describing how the maximum probable loss framework has affected its space industry.[142] Finally, if the United States were to succeed in putting together a liability limiting framework in the vein of the 1976 Convention, it would benefit its domestic laws in that the United States could simply require that missions be insured up to the liability ceiling, effectively eliminating any potential liability on the part of the United States altogether.

III. Conclusion

The international community should take steps to strengthen the regime further in anticipation of the increased amount of activity in outer space. By imposing a cap on liability similar to that of maritime law, and by requiring states and private entities to agree to binding arbitration before engaging in joint ventures, states can solve many of the issues that hold back the current adjudication framework.

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138. *See generally* Rogers, *supra* note 111.

139. *Id.* at 756.

140. *See* FAA STUDY, *supra* note 58, at 6-4.

141. *See Reopening the American Frontier*, *supra* note 51, at 6 (statement of Christopher Johnson and Ian Christensen, Secure World Foundation) (stating that historically other countries have modeled their policy after those of the United States).

142. *Id.*