

UPDATING THE LIABILITY REGIME IN OUTER SPACE:
WHY SPACEFARING COMPANIES SHOULD BE
INTERNATIONALLY LIABLE FOR THEIR SPACE OBJECTS

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INTRODUCTION

Nothing inspires the human imagination quite like outer space. How many people have laid on their backs on a dark, clear night and gazed up at the stars above? The vast expanse of outer space seems endless. But satellite operators are increasingly realizing that space is not endless. Indeed, space is becoming more crowded with space objects, and the threat of these objects causing damage is rapidly growing. The space industry has changed dramatically in recent years, and the threats facing the industry have concurrently evolved.

The world is experiencing the dawn of a new space race—only this time, private entities are leading the charge rather than government agencies.¹ Companies like SpaceX and Virgin Galactic are revolutionizing human operations in outer space by developing groundbreaking new space technologies and by crafting ambitious plans for the future of human activity in space.² The private sector's ability to harness market forces has decisively decreased the costs of operating in space, which in turn has made outer space more accessible to private entities across the globe.³ As a result, the number of space objects in orbit will continue to skyrocket in the coming years as more private actors expand their operations in

1. See Carson W. Bennett, Note, *Houston, We Have an Arbitration: International Arbitration's Role in Resolving Commercial Aerospace Disputes*, 19 PEPP. DISP. RESOL. L.J. 61, 63 (2019) ("Space, once the exclusive domain of nationalized space programs, is now becoming a crowded marketplace with ambitious businessmen seeking to change the world (and turn a profit)."); Trevor Kehrer, Comment, *Closing the Liability Loophole: The Liability Convention and the Future of Conflict in Space*, 20 CHI. J. INT'L L. 178, 189 (2019) ("[C]ommercialization of space is now nigh-universal."); Timothy Justin Trapp, Note, *Taking up Space by Any Other Means: Coming to Terms with the Nonappropriation Article of the Outer Space Treaty*, 2013 U. ILL. L. REV. 1681, 1685 (2013) ("Instead of having a state-run space program, we are moving into a space age decided by the private sector.").

2. See, e.g., *About SpaceX*, SPACE X, <https://www.spacex.com/about> [<https://perma.cc/C54E-KCAQ>]; *Purpose: Why We Go*, VIRGIN GALACTIC, <https://www.virgingalactic.com/purpose/> [<https://perma.cc/9U8D-PMXS>].

3. See Trapp, *supra* note 1, at 1685 (noting that private companies can "match the advances of NASA in a fraction of the time").

space.⁴ The probability of space objects causing damage, therefore, is only increasing.⁵

Yet, the law governing international liability for damage caused by space objects has remained shockingly stagnant. The process by which spacefaring parties are held liable under international space law has remained the same since the current liability regime was adopted in the Convention on International Liability for Damage Caused by Space Objects (Liability Convention) in 1972.⁶ The Liability Convention was drafted at a time when only two nation-states—the United States and the Soviet Union—had space-launch capabilities.⁷ Furthermore, the drafters “were neither expected nor ... required to [deal] with” private space actors at the time.⁸ As such, the Liability Convention establishes a notably state-centric framework to assign liability for damage involving space objects, in which national governments are held internationally liable for damage caused by any spacefaring actor from that country.⁹

Given the rapid privatization of the space industry, this Note argues that the international community should update the Liability Convention to reflect the modern reality that the private sector has taken the lead from the public sector in space activity. The Liability Convention is insufficient and ineffective as applied to companies, and an international liability regime that directly addresses private entities will promote certainty, investment, and development in the space industry for the benefit of all.

4. See Andrew Lavender, *How Many Satellites Orbiting the Earth in 2019?*, PIXALYTICS (Jan. 16, 2019), <https://www.pixalytics.com/satellites-orbiting-earth-2019/> [<https://perma.cc/JS8K-KQGL>]; see also Kehrner, *supra* note 1, at 189.

5. See Dan St. John, Note, *The Trouble with Westphalia in Space: The State-Centric Liability Regime*, 40 DENV. J. INT'L L. & POL'Y 686, 688 (2012).

6. Caley Albert, *Liability in International Law and the Ramifications on Commercial Space Launches and Space Tourism*, 36 LOY. L.A. INT'L & COMP. L. REV. 233, 244 (2014) (“Since these agreements were completed between 1967 and 1984, they are outdated when it comes to dealing with commercial launch companies.”); Stephanie D. Veech, Note, *To Infinity and Beyond?: The History of Space Travel and the Legal Implications of Privatized Space Flight Through the Lens of SpaceX*, 18 LOY. MAR. L.J. 151, 162-63 (2019) (“[F]ew additions have been made to space law since our first launches into the final frontier.”).

7. Yun Zhao, *Space Commercialization and the Development of Space Law*, OXFORD RSCH. ENCYCLOPEDIA (July 2018), <https://oxfordre.com/planetaryscience/view/10.1093/acrefore/9780190647926.001.0001/acrefore-9780190647926-e-42> [<https://perma.cc/RH8M-JY2J>].

8. Frans G. Von der Dunk, *Billion-Dollar Questions? Legal Aspects of Commercial Space Activities*, 23 UNIF. L. REV. 418, 423 (2018).

9. Albert, *supra* note 6, at 245-46.

Part I of this Note explores the current status of the space industry and further examines the rise of spacefaring companies. Part II reviews the treaty framework that establishes the current rules governing international liability for damage caused by space objects. Given this treaty framework, Part III assesses the weaknesses of this approach. First, gaps in the Liability Convention create uncertainty as to which State should be held liable in some cases involving spacefaring companies. Second, the treaty framework promotes the existence of flag states by encouraging national legislation to account for the incompleteness of the international treaties. Flag states foster a dangerous environment for the space industry. Third, the Liability Convention fails to establish effective enforcement mechanisms. The Convention lacks teeth as applied to companies, which renders it largely ineffective in certain instances.

As such, Part IV articulates this Note's two-part conclusion: the international community should (1) amend the Liability Convention and (2) assign liability for space object damage directly on spacefaring companies. This amendment would solve each problem described in Part III and would address the modern realities of today's space industry. Indeed, these spacefaring companies no longer require insulation from liability by their national governments. Rather, these companies have attracted enormous investment in recent years and have enough resources in their corporate treasuries to cover their own liabilities. Moreover, a clearer liability regime would promote efficiency and certainty for spacefaring companies, which would benefit their business operations. Consequently, this Note argues that the international community should modernize the Liability Convention by amending it to place liability for space object damage directly on the companies involved.

I. THE RISE OF SPACEFARING COMPANIES

Since the early days of space exploration, nation-states have controlled the trajectory of the space industry.¹⁰ The Soviet Union's launch of the satellite named Sputnik on October 4, 1957, marked the first successful launch of an object into space.¹¹ Sputnik

10. *Id.* at 238.

11. Veech, *supra* note 6, at 152.

represented a striking achievement for the Soviet Union's scientific community during the Cold War, and the United States rushed to respond in kind.¹² The U.S. Department of Defense immediately approved funding for a new satellite program,¹³ and Congress established the National Aeronautics and Space Administration (NASA) to promote space exploration "for the benefit of all mankind."¹⁴ The space race was a critical front in the Cold War as the United States and Soviet Union invested enormous amounts of money and resources into developing their national space capabilities.¹⁵

Some private actors began to invest in the space industry in the early 1980s.¹⁶ In 1980, European investors founded Arianespace, which represented the first commercial space launch service in the world.¹⁷ Strategically located near the equator in French Guiana, Arianespace's spaceport launched its first commercial payload in 1984.¹⁸ In the United States, Space Services successfully launched the world's first privately funded mission into space in 1982 from America's first licensed commercial spaceport in Texas.¹⁹ Building on these historic developments, spacefaring companies increasingly grew in influence and investment over the following decades.²⁰

Today, the space industry is largely characterized by companies jockeying for dominance in outer space—in many ways, reminiscent of the space race between the United States and the Soviet Union during the Cold War era. For example, one modern competitor, Elon

12. *Id.* at 152-53; see also *Sputnik and the Dawn of the Space Age*, NASA (Oct. 10, 2007), <https://history.nasa.gov/sputnik/> [<https://perma.cc/826B-EZMS>] [hereinafter *Sputnik*].

13. See *Sputnik*, *supra* note 12.

14. National Aeronautics and Space Act of 1958, Pub. L. No. 85-568, § 102(a), 72 Stat. 426, 426.

15. Albert, *supra* note 6, at 236; *Sputnik*, *supra* note 12.

16. Albert, *supra* note 6, at 238.

17. *Id.*; *Milestones*, ARIANESPACE, <https://www.arianespace.com/company-milestones/> [<https://perma.cc/8Z5U-VYL9>].

18. Albert, *supra* note 6, at 238.

19. *Heritage*, SPACE SERVS., <https://www.spaceservicesinc.com/company-heritage> [<https://perma.cc/9NZW-YKX5>].

20. Paul Stephen Dempsey, *National Laws Governing Commercial Space Activities: Legislation, Regulation, & Enforcement*, 36 NW. J. INT'L L. & BUS. 1, 3 ("Private-sector commercial space activity is growing at a brisk pace, while governmental activity is declining."); Zhao, *supra* note 7 ("The last two decades have witnessed the rapid and successful development of these commercial [space] activities, and there are [sic] a much broader range of space actors.").

Musk, said during a press conference in Cape Canaveral in 2018: “We want a new space race. Races are exciting.”²¹ Musk’s company, SpaceX, has become one of the most revolutionary actors in the space industry. Founded in 2002 “with the ultimate goal of enabling people to live on other planets,” SpaceX became the first private entity to deliver cargo to and from the International Space Station in 2012.²² SpaceX continues to develop state-of-the-art rockets, and it was the first private entity to launch humans into orbit on May 30, 2020.²³

Jeff Bezos is another visionary billionaire whose company, Blue Origin, seeks to remake how humans approach outer space.²⁴ By striving “to build[] a road to space,”²⁵ Blue Origin has played a leading role in developing reusable rocket systems, which make the company’s launch services significantly more affordable and sustainable.²⁶ Blue Origin is also a market leader in the space tourism industry, and prospective astronauts will soon be able to make an eleven-minute trip to space on board the New Shepard rocket.²⁷

21. Alan Yuhas, *The New Space Race: How Billionaires Launched the Next Era of Exploration*, GUARDIAN (Feb. 9, 2018, 11:31 AM), <https://www.theguardian.com/science/2018/feb/09/new-space-race-billionaires-elon-musk-jeff-bezos> [<https://perma.cc/7KDB-RG52>].

22. *About SpaceX*, *supra* note 2. SpaceX has many other significant achievements, such as its 2018 launch of Falcon Heavy, “the world’s most powerful operational rocket by a factor of two.” *Id.* The company “is working on a next generation of fully reusable launch vehicles that will be the most powerful ever built, capable of carrying humans to Mars and other destinations in the solar system.” *Id.*

23. Jonathan O’Callaghan, *SpaceX Makes History with First-Ever Human Rocket Launch for NASA*, FORBES (May 30, 2020, 3:25 PM), <https://www.forbes.com/sites/jonathanocallaghan/2020/05/30/spacex-makes-history-with-first-ever-human-rocket-launch-for-nasa/#5f861dda5321> [<https://perma.cc/95J2-4AFS>].

24. *See Blue’s Mission*, BLUE ORIGIN, <https://www.blueorigin.com/our-mission> [<https://perma.cc/T7VW-DCMN>].

25. *Id.*

26. *Reusability*, BLUE ORIGIN, <https://www.blueorigin.com/our-mission> [<https://perma.cc/T7VW-DCMN>].

27. *Become an Astronaut*, BLUE ORIGIN, <https://www.blueorigin.com/new-shepard/become-an-astronaut/> [<https://perma.cc/YX87-77QX>]. Interested and adventurous readers should see *Interested in Reserving a Window Seat?*, BLUE ORIGIN, <https://www.blueorigin.com/new-shepard/become-an-astronaut/reserve-a-seat> [<https://perma.cc/3BYP-VDA5>].

The third “space baron” of note is Sir Richard Branson,²⁸ founder of Virgin Galactic (as well as its larger parent company, Virgin Group).²⁹ To improve public access to space, Virgin Galactic focuses on “developing and operating a new generation of space vehicles to open space for everyone.”³⁰ Its reusable SpaceShipTwo spaceflight system is the world’s first passenger-carrying spaceship built by a company and operated in commercial service.³¹ In this way, Virgin Galactic is locked in a race with its industry rivals to reach previously unthinkable milestones in space technology and development.

This private space race is changing all the old space industry rules. As companies compete to create reusable rocket materials and more efficient spacecraft designs, the costs of entering space have dramatically decreased.³² The private sector is taking notice. Indeed, with lower costs in the space industry, outer space is now more attainable than ever for private entities.³³

Many entrepreneurs have responded and developed ambitious plans to send more satellites into orbit.³⁴ For instance, Princess

28. Bennett, *supra* note 1, at 63 (“Today, a new group of ‘Space Barons’ featuring Elon Musk, Jeff Bezos, and Sir Richard Branson, have started a new space race and raised the stakes.”).

29. *Find a Virgin Company*, VIRGIN, virgin.com/company [https://perma.cc/W7MJ-PNYX]; Gwyn Topham & Julia Kollewe, *Richard Branson’s Virgin Galactic Prepares to Go Public*, GUARDIAN (July 9, 2019, 3:28 PM), https://www.theguardian.com/science/2019/jul/09/richard-branson-virgin-galactic-go-public [https://perma.cc/47VE-ADFG].

30. *Mission*, VIRGIN GALACTIC, https://www.virgingalactic.com/mission/ [https://perma.cc/X76P-HAUV].

31. *Id.*

32. See Jamie Freed, *Europe’s Arianespace Takes on SpaceX by Cutting Ariane 5 Rocket Launch Price*, REUTERS (Jan. 23, 2019, 3:38 AM), https://www.reuters.com/article/us-ariane-space-asia/europes-arianespace-takes-on-spacex-by-cutting-ariane-5-rocket-launch-price-idUSKCN1PH0Q9 [https://perma.cc/8PCA-E9C4] (“Europe’s Arianespace is discounting the price of satellite launches with its Ariane 5 rockets as it competes against U.S. rival SpaceX for customers before the release of the cheaper Ariane 6 rocket next year.”); *Why Big Business Is Making a Giant Leap into Space*, KNOWLEDGE@WHARTON (June 4, 2019), https://knowledge.wharton.upenn.edu/article/commercial-space-economy/ [https://perma.cc/PD9N-XER5] (“Recently, the cost of launching a satellite has declined to about \$60 million from \$200 million because of reusable rockets ... with a potential drop to as low as \$5 million. Satellite mass production could decrease the cost from \$500 million per satellite to \$500,000.”); Yuhas, *supra* note 21 (comparing the average cost of \$60 million for SpaceX’s Falcon 9 launches with NASA’s projected cost of about \$1 billion for its Space Launch System launches).

33. See *Why Big Business Is Making a Giant Leap into Space*, *supra* note 32.

34. See, e.g., *Expanded Partnership with SES to Give Princess Cruises First Access to Ground-Breaking O3b mPOWER Satellite-Based Communications System*, PR NEWSWIRE (Feb. 3, 2020, 8:00 AM), https://www.prnewswire.com/news-releases/expanded-partnership-

Cruises, a leading subsidiary of the Carnival Corporation, recently announced an expanded partnership with SES that will allow Princess Cruises to become the first global cruise ship fleet with access to SES's satellite-based o3b mPOWER network.³⁵ This groundbreaking development will provide “unmatched and ubiquitous global Wi-Fi service levels” to guests onboard Princess cruise ships.³⁶

Perhaps the most ambitious satellite plan is SpaceX's Starlink project. Starlink is SpaceX's plan to build an internet satellite network to beam high-speed internet anywhere on the planet.³⁷ Early plans called for launching nearly 12,000 satellites flying in low Earth orbit over the next eight years.³⁸ Recent reports, however, indicate SpaceX has increased that number to 42,000 satellites—twenty times the number of operational satellites in orbit today.³⁹ Several other companies, such as Amazon and Telesat, are competing with SpaceX to develop and operate a similar network of internet satellites.⁴⁰

This spike in private-sector space activity goes to show that space is about to get much more crowded as companies and governments capitalize on the new access humans have to space.⁴¹ A tremendous increase in the number of space objects appears to be one of the many ways in which spacefaring companies are transforming the space industry. NASA technocrats no longer monopolize the industry. Instead, the space industry of today is soaring to new heights on innovation and competition between private actors.

with-ses-to-give-princess-cruises-first-access-to-ground-breaking-o3b-mpower-satellite-based-communications-system-300997449.html [https://perma.cc/E5VA-2J4F].

35. *Id.*

36. *Id.*

37. Dave Mosher, *SpaceX May Want to Launch 42,000 Internet Satellites—About 5 Times More Spacecraft than Humanity Has Ever Flown*, BUS. INSIDER (Oct. 17, 2019), <https://www.businessinsider.my/spacex-starlink-internet-satellites-itc-filing-30000-additional-42000-total-2019-10/> [https://perma.cc/4UQU-WMFH].

38. *Id.*

39. *Id.*

40. *Id.*; Michael Sheetz & Magdalena Petrova, *Why in the Next Decade Companies Will Launch Thousands More Satellites than in All of History*, CNBC (Dec. 17, 2019, 10:57 AM), <https://www.cnn.com/2019/12/14/spacex-onweb-and-amazon-to-launch-thousands-more-satellites-in-2020s.html> [https://perma.cc/A67Y-HJE9].

41. See Albert, *supra* note 6, at 234; Kehrer, *supra* note 1, at 189-90.

II. THE TREATY FRAMEWORK GOVERNING LIABILITY IN SPACE

Five United Nations treaties form “the nucleus of [international] space law.”⁴² These treaties are legally binding upon the states that ratify them, and they place numerous obligations on spacefaring states.⁴³ The first of these treaties, the Outer Space Treaty of 1967, is “[r]egarded as the ‘Magna Carta’ of outer space, [and it established the foundational] principles concerning the exploration and use of outer space.”⁴⁴ Over the next twelve years, the international community supplemented the Outer Space Treaty with four additional treaties that collectively comprise the legal framework governing human activity in space.⁴⁵ Within these treaties, the issue of liability in space was first addressed in the Outer Space Treaty.⁴⁶ The Liability Convention subsequently expanded on the principles of international space liability.⁴⁷

A. *The Outer Space Treaty*

Article VI of the Outer Space Treaty of 1967 provides a foundational principle of space law that guides its treatment of private actors and liability allocation in space.⁴⁸ Article VI posits that signatory states “shall bear international responsibility for national activities in outer space ... whether such activities are carried on by governmental agencies or by nongovernmental entities.”⁴⁹ In other

42. TANJA MASSON-ZWAAN & MAHULENA HOFMANN, INTRODUCTION TO SPACE LAW 15-16 (4th ed. 2019); Zhao, *supra* note 7.

43. MASSON-ZWAAN & HOFMANN, *supra* note 42, at 15; Dempsey, *supra* note 20, at 5-6.

44. Adrian Taghdiri, Note, *Flags of Convenience and the Commercial Space Flight Industry: The Inadequacy of Current International Law to Address the Opportune Registration of Space Vehicles in Flag States*, 19 B.U. J. SCI. & TECH. L. 405, 408 (2013).

45. *Id.* The subsequent treaties are: (1) the 1968 Rescue Agreement governing the recovery and return of foreign astronauts and space objects; (2) the 1972 Liability Convention governing liability for damage caused by space objects; (3) the 1975 Registration Convention governing the registration of space objects with the United Nations; and (4) the 1979 Moon Agreement governing space activity on the Moon. *Id.*

46. See Dempsey, *supra* note 20, at 9.

47. *Id.*

48. See *id.* at 6.

49. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies art. VI, Jan. 27, 1967, 18 U.S.T.

words, Article VI opened the door for private activities in space, provided that “the appropriate state exercise[] authority and ... supervision over [the private actors].”⁵⁰ This article is significant because it is the only provision that mentions private actors in space, who had no formal standing under any of the space treaties.⁵¹ In this way, Article VI represented a consequential compromise between the United States and the Soviet Union.⁵² In negotiating the Outer Space Treaty, the United States wanted to involve private parties in the discussions.⁵³ The Soviet Union, however, sought to limit space activities to only states.⁵⁴ Ultimately, the superpowers compromised to allow Article VI to open the door for private entities to operate in space, yet the treaty guarantees national governments will play the decisive role in governing space activity.⁵⁵

Articles VII and VIII of the Outer Space Treaty build on this principle of state preeminence in space. Article VII maintains that “[e]ach State Party to the Treaty that launches or procures the launching of an object into outer space ... and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party.”⁵⁶ Relatedly, Article VIII proclaims that each state “on whose registry an object launched into outer space [has been registered] shall retain jurisdiction and control” over that object while in outer space.⁵⁷ Both of these articles provided the key foundational principles relating to liability in space on which the Liability Convention expanded when it was drafted five years later.⁵⁸

B. The Liability Convention

Building on these articles of the Outer Space Treaty, the Liability Convention of 1972 constructs a comprehensive framework by which

2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

50. Dempsey, *supra* note 20, at 6.

51. Von der Dunk, *supra* note 8, at 423.

52. *See* Dempsey, *supra* note 20, at 6.

53. *Id.*

54. *Id.*

55. *Id.*

56. Outer Space Treaty, *supra* note 49, art. VII.

57. *Id.* art. VIII.

58. MASSON-ZWAAN & HOFMANN, *supra* note 42, at 20.

liability for damage caused by space objects is assigned.⁵⁹ In the preamble, signatory states recognized “the need to elaborate effective international rules and procedures concerning liability for damage caused by space objects and to ensure, in particular, the prompt payment of a full and equitable measure of compensation to victims of such damage.”⁶⁰

The body of the Liability Convention assigns liability on launching states to pay compensation for damage caused by their space objects.⁶¹ The Convention defines “launching State” as either “[a] State which launches or procures the launching of a space object,” or “[a] State from whose territory or facility a space object is launched.”⁶² This definition means that four states can qualify as “launching states” for purposes of the Liability Convention: (1) the state that launches a space object; (2) the state that procures the launching of a space object; (3) the state whose territory has been used for a launch; and (4) “the [s]tate from whose facility a space object is launched.”⁶³ As such, victim states can recover the full amount of damage from any of these states.⁶⁴ If multiple states qualify as the launching state of a space object, then those states may be held jointly and severally liable for the damage.⁶⁵

In determining the standard of liability, the Liability Convention distinguishes between the two locations where damage may occur.⁶⁶ On the one hand, if the damage occurs on Earth or to aircraft in flight, then the launching state is strictly liable for any damage caused by its space object.⁶⁷ For example, this strict liability would be invoked if debris from a space object were to fall to the earth and damage property in a foreign country.⁶⁸ On the other hand, if the damage occurs in outer space, then the launching state is “liable only if the damage is due to its fault or the fault of persons for whom

59. See Dempsey, *supra* note 20, at 9-10.

60. Convention on International Liability for Damage Caused by Space Objects pmbl., Mar. 29, 1972, 24 U.S.T. 2389, 2391, 961 U.N.T.S. 187, 189 [hereinafter Liability Convention].

61. Dempsey, *supra* note 20, art. I.

62. Liability Convention, *supra* note 60, at 2392.

63. MASSON-ZWAAN & HOFMANN, *supra* note 42, at 27.

64. *Id.*

65. Liability Convention, *supra* note 60, art. V.

66. *See id.* art. II.

67. *Id.*

68. *See id.*

it is responsible.”⁶⁹ For example, this fault liability would be invoked if two objects were to collide in space.⁷⁰

If a launching state’s space object causes damage, the Liability Convention establishes a detailed process through which the victim state can claim compensation from the launching state. First, a victim state must present a claim for compensation to the relevant launching state no later than one year after the damage occurs.⁷¹ The parties must then attempt to settle the claim through diplomatic channels.⁷² If the parties fail to arrive at a settlement within one year, however, they must then establish a Claims Commission to adjudicate the claim.⁷³

The Claims Commission is composed of three members: one appointed by the launching state, one appointed by the victim state, and one—the Chairman—chosen jointly by the parties.⁷⁴ The Claims Commission then decides the merits of the claim and determines the amount that the launching state must pay, if any.⁷⁵ The Commission’s decision “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.”⁷⁶ In other words, both parties must agree to accept the Commission’s decision for it to bind the parties.⁷⁷ If one or both parties object, then the decision is merely “recommendatory.”⁷⁸

The Liability Convention provides a thorough and comprehensive framework through which parties can settle claims relating to damage by space objects. Nevertheless, parties have invoked the terms of the Convention only once in history.⁷⁹ That incident occurred in 1978 when Cosmos 954, a Soviet spy satellite, depressurized

69. *Id.* art. III.

70. *See id.*

71. *Id.* art. X, ¶ 1.

72. *Id.* art. II.

73. *Id.* art. XIV.

74. *Id.* art. XV, ¶ 1.

75. *Id.* art. XVIII.

76. *Id.* art. XIX, ¶ 2.

77. *See id.*

78. *Id.*

79. Kehrler, *supra* note 1, at 185.

and deorbited to Earth.⁸⁰ The satellite crashed and scattered debris over 124,000 square miles of Canadian wilderness.⁸¹ Because the satellite was powered by a nuclear reactor, the debris was radioactive and required a high degree of care and urgency to clean up.⁸² Canada located and disposed of the dangerous debris at a cost of C\$13.97 million.⁸³ About one year after the incident, Canada presented a claim against the Soviet Union under the Liability Convention for C\$6.94 million for the cleanup costs.⁸⁴ The Soviet Union, however, “argue[d] that Canada had taken excessive measures to restore the environment” and paid only C\$3 million to settle the claim.⁸⁵ Because the countries jointly settled the claim, they did not need to establish a Claims Commission to adjudicate the case.⁸⁶ However, because the damage occurred on Earth, the Liability Convention would have held the Soviet Union strictly liable for the damage if the claim had been adjudicated.⁸⁷ To date, this incident remains the only claim brought under the Liability Convention.⁸⁸

Yet, numerous other incidents on Earth could have been grounds for invoking the Liability Convention. Indeed, satellites have reentered Earth on several occasions in recent decades. In 1979, Skylab, a NASA space station weighing seventy-four tons, crashed into the Australian countryside.⁸⁹ In 2011, a twenty-year-old NASA satellite fell to the earth and scattered debris across the Pacific

80. Luke Punnakanta, Note, *Space Torts: Applying Nuisance and Negligence to Orbital Debris*, 86 S. CAL. L. REV. 163, 170 (2012).

81. *Id.*

82. *Id.*; Steve Weintz, *Operation Morning Light: The Nuclear Satellite That Almost Decimated America*, NAT'L INTEREST (Nov. 23, 2015), <https://nationalinterest.org/feature/operation-morning-light-the-nuclear-satellite-almost-14411> [<https://perma.cc/T6ZK-96B7>].

83. Punnakanta, *supra* note 80, at 170.

84. Van C. Ernest, Note, *Third Party Liability of the Private Space Industry: To Pay What No One Has Paid Before*, 41 CASE W. RES. L. REV. 503, 525 (1991).

85. *Id.*

86. *See id.*

87. Punnakanta, *supra* note 80, at 177.

88. *Id.* at 176.

89. *Id.* at 171. When NASA officials came to collect the debris, the town of Esperance, Western Australia, good-naturedly issued them a \$400 fine for littering. *When Western Australia Fined NASA*, TRACES (Apr. 17, 2018), <https://www.tracesmagazine.com.au/2018/04/when-western-australia-fined-nasa/> [<https://perma.cc/Y6LW-6DKS>]. NASA never paid the fine, though a California radio host launched a donation campaign for his listeners thirty years later to finally pay the fine for NASA. *Id.*

Ocean.⁹⁰ Perhaps the most notable incident of space object reentry occurred in 1997 when a falling piece of space debris from a rocket hit a woman in Tulsa, Oklahoma.⁹¹

Moreover, several other incidents in outer space could have invoked the Liability Convention. The first recorded collision between two satellites in outer space occurred on February 10, 2009, when an American commercial satellite collided with a decommissioned Russian military satellite.⁹² The collision destroyed the satellites and created at least two thousand pieces of large space debris in Earth's orbit.⁹³ More recently, in September 2019, one of SpaceX's new Starlink internet satellites narrowly avoided a collision with one of the European Space Agency's (ESA) wind-monitoring satellites.⁹⁴ As the odds of a collision neared 1-in-1000, the ESA attempted to contact SpaceX.⁹⁵ SpaceX claimed that it did not receive the ESA's messages due to a software bug, however, so the ESA unilaterally adjusted the orbit of its satellite to avoid risking a collision.⁹⁶ While none of these incidents resulted in a party filing a claim under the Liability Convention, they collectively illustrate the tremendous risk of damage that accompanies space-related activities.

90. Punnakanta, *supra* note 80, at 170-71.

91. Tony Long, *Jan. 22, 1997: Heads Up, Lottie! It's Space Junk!*, WIRED (Jan. 22, 2009, 12:00 AM), <https://www.wired.com/2009/01/jan-22-1997-heads-up-lottie-its-space-junk/> [<https://perma.cc/TKM5-ZX7P>]. Lottie Williams remains "the only person believed to have been [struck] by a piece of space debris." *Id.* She did not sustain injuries from the incident. *Id.* ("She was struck a glancing blow, and the debris was relatively light and probably traveling at a low velocity. It was also subject to wind currents, which mitigated the impact even further.")

92. Scott Kerr, *Liability for Space Debris Collisions and the Kessler Syndrome (Part 1)*, SPACE REV. (Dec. 11, 2017), <http://www.thespacereview.com/article/3387/1> [<https://perma.cc/B97C-BGA7>].

93. *Id.*

94. Dave Mosher, *Billionaires Plan to Launch Tens of Thousands of New Satellites. Experts Are Working Hard to Ensure This Doesn't Lead to a Disaster that Ends Human Access to Orbit*, BUS. INSIDER (Dec. 27, 2019, 2:25 PM), <https://www.businessinsider.com/space-junk-kessler-syndrome-chain-reaction-prevention-2018-3> [<https://perma.cc/8SVK-MXKY>].

95. *Id.*

96. Loren Grush, *A Bug in SpaceX's Communication System Kept the Company in the Dark About Potential Satellite Collision*, VERGE (Sept. 4, 2019, 1:36 PM), <https://www.theverge.com/2019/9/3/20847243/spacex-starlink-satellite-european-space-agency-aeolus-conjunction-space-debris> [<https://perma.cc/MND5-CND4>].

Certainly, as the number of space objects in orbit increases exponentially in the coming years, the risk of one of these space objects causing damage will inevitably skyrocket.⁹⁷ The Liability Convention, therefore, will play an increasingly important role in assigning liability for these incidents, and the limits of the Liability Convention will surely be tested in the coming years. Given that companies are likely to dominate outer space in the future, the Liability Convention should provide an efficient and effective process for assigning liability between these companies.

III. THE LIABILITY CONVENTION FAILS TO PROVIDE AN EFFECTIVE LIABILITY REGIME AS APPLIED TO SPACEFARING COMPANIES

The governing treaty framework was drafted at a time when national governments—namely, the United States and the Soviet Union—monopolized outer space activity.⁹⁸ National governments were thought to be the only entities with enough resources to undertake a mission to outer space.⁹⁹ As a result, the procedures that the space treaties establish are notably “state-centric.”¹⁰⁰

Indeed, the space treaties barely mention private space activity. Of the treaties that concern liability, the only provision that directly relates to the private sector is the Outer Space Treaty’s general toleration of private activity in space, as long as the appropriate state authorizes and supervises the private actors.¹⁰¹ The Liability Convention does not directly mention private activities.¹⁰² Consequently, the Liability Convention has serious gaps when applied to companies whose space objects have damaged foreign parties.

97. See Mosher, *supra* note 94 (“As we rocket more stuff into space, the odds of one crashing into another at very high speeds inextricably goes up.”).

98. Albert, *supra* note 6, at 236.

99. Von der Dunk, *supra* note 8, at 419.

100. See St. John, *supra* note 5, at 687 (noting that the space treaties “are products of the Westphalian state system”).

101. Dempsey, *supra* note 20, at 6. Generally, states establish licensing systems and regulatory oversight procedures to comply with these requirements. *Id.*

102. See Liability Convention, *supra* note 60.

A. “*Launching State*” Ambiguities

First, the Convention’s definition of “launching state” can make it difficult to pinpoint which state should be held liable for a company’s space objects.¹⁰³ This problem is best illustrated by the 2009 satellite collision between the defunct Russian military satellite, Kosmos 2252, and the operational American commercial satellite, Iridium 33. An American company owned Iridium 33, but the satellite was launched from a Russian-owned spaceport.¹⁰⁴ After the collision, Iridium could have filed a claim for compensation under the Liability Convention.¹⁰⁵ Had Iridium done so, Iridium would have had to enlist the U.S. State Department to negotiate on its behalf with the Russian Ministry of Foreign Affairs.¹⁰⁶ Because Iridium was incorporated in the United States, Iridium could have argued that the United States “procured” the launch, and therefore should be considered the relevant launching state according to Article I of the Liability Convention.¹⁰⁷

The Russians could have argued, however, that the definition of “launching state” in Article I mandates that Iridium 33 be considered a Russian space object because it was launched from a Russian spaceport.¹⁰⁸ As such, Russia could have contended that it should be allowed to assign liability for the collision internally because Article VII of the Liability Convention prohibits two parties from the same country from invoking the terms of the Convention against each other.¹⁰⁹ The parties would be at an impasse if they failed to settle this jurisdictional matter, which would prevent them from achieving an equitable adjudication of the issue.¹¹⁰

103. *Space Law Is Inadequate for the Boom in Human Activity There*, ECONOMIST (July 18, 2019), <https://www.economist.com/international/2019/07/18/space-law-is-inadequate-for-the-boom-in-human-activity-there> [<https://perma.cc/DK2E-7HP8>] [hereinafter *Space Law Is Inadequate*]; see also MASSON-ZWAAN & HOFMANN, *supra* note 42, at 27 (“[I]t is likely that several States can be considered as launching States and held liable for damage.”).

104. *Space Law Is Inadequate*, *supra* note 103.

105. *Id.*

106. *Id.*

107. MASSON-ZWAAN & HOFMANN, *supra* note 42, at 27.

108. See *Space Law Is Inadequate*, *supra* note 103.

109. See Liability Convention, *supra* note 60, art. VII; *Space Law Is Inadequate*, *supra* note 103.

110. See *Space Law Is Inadequate*, *supra* note 103.

This problem stems from the Liability Convention's failure to illustrate how to proceed should multiple states have a reasonable claim to being the claimant state, yet one of these states is also the launching state of a company's space object.¹¹¹ Should the launching states be jointly and severally liable as provided for in Article V¹¹² when multiple states act as the launching state? That approach would violate Article VII's prohibition on intrastate parties invoking the Liability Convention against each other.¹¹³ Should Article VII prohibit a launching state from also asserting it is the claimant state in the event of multiple launching states? That strategy would conflict with Article I's definition of launching state.¹¹⁴ The Liability Convention does not provide answers to these questions. By establishing a regime based on state liability, the Liability Convention has created ambiguity as to which states should act as the representatives of companies engaged in space activity.

This ambiguity significantly diminishes the Liability Convention's efficacy because it creates uncertainty as to the identity of the parties involved in the claim.¹¹⁵ Furthermore, it forces the parties to debate ancillary procedural issues rather than the claim's substantive elements.¹¹⁶ As companies increasingly become the major actors in space, this ambiguity in the Liability Convention will play a more significant role when companies pursue liability claims against one another. This problem is further exacerbated by the fact that most modern spacefaring companies are multinational corporations with operations and spaceports in several countries across the globe.¹¹⁷ As such, it will become increasingly difficult to isolate the states through which companies should negotiate their claims.¹¹⁸ Therefore, the "state-centric"¹¹⁹ procedures of the Liability

111. *See id.*

112. *See* Liability Convention, *supra* note 60, art. V.

113. *See id.* art. VII.

114. *See id.* art. I.

115. *See Space Law Is Inadequate*, *supra* note 103.

116. *See supra* notes 103-13 and accompanying text.

117. *See, e.g., Company Profile*, ARIANESPACE, <https://www.arianespace.com/company-profile/> [<https://perma.cc/AQ4D-XHTL>] (noting that Arianespace has launch sites in two different countries, employees dedicated to customer service in five different countries, and an overall "global presence").

118. *See id.*

119. St. John, *supra* note 5, at 689.

Convention raise critical questions when companies become the primary players involved in pursuing liability claims for damage caused by space objects.

B. Flag States

Flag states represent a significant and growing threat to the international liability regime governing outer space.¹²⁰ The “flag state” concept comes from maritime law and commonly means that “the owner of a vessel [wishes to avoid] an obligation [to] a country with strict[] standards for [vessel] registry.”¹²¹ Consequently, the owner will register the vessel with a flag state that has more lenient registration requirements purely for economic purposes.¹²² By flying this “flag of convenience,” the owner is able to avoid certain taxation or regulatory requirements of its home state, which therefore reduces the company’s operating costs.¹²³ Flag states are often criticized for fostering criminal activity, poor working conditions, and environmental damage due to “loose” regulations and oversight by the flag states.¹²⁴

Many scholars have recognized the dangers of flag states in the space industry.¹²⁵ Indeed, commercial space companies may be

120. See, e.g., Albert, *supra* note 6, at 251-52 (“Launching from states with lower safety standards increases the potential for catastrophic launch events.”); Dempsey, *supra* note 20, at 43 (“It would be shameful if commercial space activities were attracted to the jurisdictions with the lowest taxes and lowest cost regulatory structure, at the expense of safety and environmental protections.”); Taghdiri, *supra* note 44, at 417 (“As a result of the inadequate dispute settlement procedures [of the Liability Convention], a flags of convenience problem may soon arise in the commercial spaceflight industry.”).

121. Albert, *supra* note 6, at 251.

122. *Id.*

123. *Id.*

124. Taghdiri, *supra* note 44, at 418. For example, the Deepwater Horizon oil rig that exploded in the Gulf of Mexico in 2010 caused enormous environmental damage. *Id.* The rig was registered in the Marshall Islands, and “U.S. government reviews of the [disaster] criticized the Marshall Islands’ oversight of the vessel.” *Id.* U.S. government officials “suggested that the foreign registration was an effort to evade strict safety standards,” such as those of the United States. *Id.*

125. See, e.g., Dempsey, *supra* note 20, at 43 (“States should attempt to harmonize their laws with other States, so that global uniformity might be enhanced, and flag-of-convenience type forum shopping discouraged.”); Taghdiri, *supra* note 44, at 419-20 (“[A]s the commercial space industry develops, attempts to obtain cost economies and attempts to remain competitive in the industry may pose a threat to both the environment and space tourists.”).

incentivized to “seek out the most convenient state for launch, [which will] most likely [be] the state that provides the most liability coverage and has the least safety precautions.”¹²⁶ As a result, more launches from states with lower safety standards heightens the risk for dangerous launch accidents or space object malfunctions.¹²⁷

Furthermore, states that offer the “best deal” to commercial space companies may also be less likely to pay damages if an injured party files a claim for compensation under the Liability Convention, which could prevent the injured party from recovering for the damage.¹²⁸ One of the primary goals of the Liability Convention is “to ensure ... the prompt payment ... of a full and equitable measure of compensation to victims of [space object] damage.”¹²⁹ The Convention’s tolerance of flag states—which may jeopardize the ability of victims to be compensated for their damage—is therefore particularly distressing.

The problems associated with flag states arise from the patchwork of national space legislation that states have adopted to govern their commercial space industries.¹³⁰ To comply with their obligations under the Outer Space Treaty, spacefaring states have generally established licensing and regulatory regimes to govern commercial space companies and ensure that they adhere to the international rules outlined in the treaties.¹³¹ Additionally, national space legislation allows states to promote certain space policies that are in the national interest.¹³² As a result, many states have developed comprehensive licensing, regulatory, insurance, and indemnificatory regimes for spacefaring companies operating within their jurisdiction.¹³³ These regimes are all different from each other, however, which leads to the problems associated with flag states in the space industry.¹³⁴

126. Albert, *supra* note 6, at 251.

127. *Id.* at 251-52.

128. *Id.* at 250.

129. Liability Convention, *supra* note 60, pmbl.

130. See Albert, *supra* note 6, at 251.

131. MASSON-ZWAAN & HOFMANN, *supra* note 42, at 47.

132. *Id.*

133. Dempsey, *supra* note 20, at 14-41.

134. See Albert, *supra* note 6, at 250 (“This variation among nation states gives commercial space companies a variety of options to choose from when deciding where to launch.”); Dempsey, *supra* note 20, at 42 (“[T]he law addressing space activities varies extensively from

The Liability Convention has created an “uneven playing field” for spacefaring states, which in turn has created a dangerous environment for the space industry.¹³⁵ Consequently, a structural change to the Liability Convention is necessary to protect against the dangers that flag states create.

C. Lack of Enforcement Mechanisms

The Liability Convention lacks teeth when applied to private parties, which creates strong incentives for spacefaring companies to avoid invoking the Convention in a dispute regarding space object damage.¹³⁶ Because the crux of the Convention’s dispute resolution procedure relies on good faith negotiations between the parties, the Convention is premised on the idea that the parties can come to a mutual understanding regarding liability and compensation for the damage in dispute.¹³⁷ Article XIV calls for the establishment of a Claims Commission only after the parties have unsuccessfully negotiated for a year through diplomatic channels.¹³⁸ Even the Claims Commission’s final adjudication relies on the good faith of the parties: Article XIX maintains that the decision of the Commission is binding only if the parties agree for it to be binding.¹³⁹ If they do not agree, then the Commission’s decision is merely “recommendatory,” and “the parties shall consider [the decision] in good faith.”¹⁴⁰ Consequently, a party seeking to avoid liability at all costs could take advantage of the Liability Convention’s weak enforcement mechanisms and could refuse to participate in any meaningful dispute resolution under the Convention.¹⁴¹ The Convention’s

State to State.”).

135. Albert, *supra* note 6, at 250.

136. See H.L. VAN TRAA-ENGELMAN, COMMERCIAL UTILIZATION OF OUTER SPACE 65 (1993) (“In particular, the nature of the decision delivered by the Claims Commission, which shall be final and binding only ‘if the parties have so agreed,’ represents a great deal of insecurity in this respect.” (footnote omitted)).

137. See Kehrer, *supra* note 1, at 187 (“The Liability Convention’s critical dependence on good-faith negotiation is not the only mechanical difficulty the liability regime faces.”).

138. Liability Convention, *supra* note 60, art. XIV.

139. *Id.* art. XIX, ¶ 2.

140. *Id.*

141. See Kehrer, *supra* note 1, at 187 (“[I]f the launching state is hostile to the victim state or if it determines that the liability regime is unfair as applied to launching states generally, it will simply not participate in dispute resolution.”).

procedures therefore lead to uncertainty and fail to set forth an effective liability regime for spacefaring companies.

Because of the Liability Convention's ineffective enforcement mechanisms, many spacefaring companies are finding ways to prevent the Convention from being invoked if their space objects were to damage an international party.¹⁴² In fact, many companies are contracting around liability issues to resolve disputes extrajudicially.¹⁴³ Companies include cross-waivers of liability into their contracts with each other, such that "each party agrees to bear its own risk."¹⁴⁴ If an issue arises, the parties will adjudicate the dispute as a matter of contract law in municipal court, rather than through the terms of the Liability Convention.¹⁴⁵ In this way, companies seek to create "some certainty about the law governing the[ir] dispute[s]."¹⁴⁶

These tactics by spacefaring companies illustrate that the Liability Convention is ineffective and woefully underdeveloped as applied to disputes between private parties. If private enterprise is to continue leading the exploration and development of outer space in the years to come, then the international liability regime should be updated to provide spacefaring companies with effective mechanisms to govern liability disputes between private parties.

IV. AMEND THE LIABILITY CONVENTION

As demonstrated in Part III, the Liability Convention is ill-equipped to govern international liability disputes between spacefaring companies. While the drafters of the Liability Convention did not preclude space activity by private actors, they did not account for it either.¹⁴⁷ In an age where private actors are rapidly expanding their activity and presence in outer space, this absence

142. St. John, *supra* note 5, at 712.

143. *Id.*

144. *Id.*

145. *Id.* at 712-13.

146. *Id.* at 713 ("Business will not let an imperfect treaty structure hinder space development.").

147. See Zhao, *supra* note 7 ("[L]egal issues related to space commercialization were not the main regulatory targets for these five treaties, which is understandable in view of the time when these treaties were drafted.").

is particularly troubling. Consequently, this Note argues that the international community should amend the Liability Convention to account precisely for the activities of companies in space. It is time to assign liability directly on the companies whose space objects damage an international party.

A. An International Approach Is Necessary

This Note calls for an international approach to amend the space liability regime. An international agreement would create a universal standard by which all space object liability claims would be adjudicated.¹⁴⁸ This unified approach is necessary for two primary reasons.

First, variance among national space laws causes the problems associated with flag states.¹⁴⁹ Indeed, national laws regulating space activity, such as licensing and indemnification requirements, vary extensively among states.¹⁵⁰ Some States—like the United States—have enacted a comprehensive regulatory regime, while others have a more meager regime.¹⁵¹ To reduce regulatory costs, companies may choose to operate in states with lenient regulatory and indemnification requirements, at the expense of safety and reliability.¹⁵² As such, an international effort to set liability procedures is preferable because it would help mitigate the variance in national liability requirements for the space industry. Spacefaring companies therefore would have to comply with liability procedures that the

148. See Rachel Mitchell, *Into the Final Frontier: The Expanse of Space Commercialization*, 83 MO. L. REV. 429, 448 (2018).

149. See *supra* Part III.B.

150. Dempsey, *supra* note 20, at 31, 42; see also Mitchell, *supra* note 149, at 448 (“The lack of a comprehensive regulatory scheme for commercial activities could create a new ‘Wild West’ in outer space.”).

151. See Dempsey, *supra* note 20, at 25-27. For example, the United States requires every U.S. citizen to obtain authorization from the Federal Aviation Administration (FAA) “to launch, reenter, or operate a launch or reentry site” for space objects anywhere in the world. *Id.* at 26. The FAA considers “public health and safety, safety of property, and U.S. national security and foreign policy concerns” when evaluating a launch application and regulating these launches. *Id.* Conversely, Argentina has much less stringent authorization requirements. *Id.* at 27-28. The government requires merely that actors register with the government before engaging in space activities. *Id.*

152. Taghdiri, *supra* note 44, at 419-20.

international community agrees are adequate for the industry, thus reducing the threats that flag states pose.

Second, an international effort to reconcile the Liability Convention with the rise of commercial space companies would play a crucial role in fostering international cooperation in space. Currently, each of the five governing space treaties emphasize that humans should develop outer space for the benefit of all countries and humankind.¹⁵³ The introduction of a uniform international liability regime would promote global cooperation and recognize the shared international interests in developing outer space.¹⁵⁴ This cooperation will become increasingly necessary as humans must collectively confront the new challenges arising in space, such as the proliferation of space debris.¹⁵⁵ Outer space has long been treated as “the province of all mankind,”¹⁵⁶ which “is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”¹⁵⁷ As such, a comprehensive international liability regime would protect the shared interests of all countries and humankind in outer space.

Many scholars argue, however, that domestic legislation has sufficiently filled in the Liability Convention’s gaps; therefore, changes to the liability regime in space should be made at the national level.¹⁵⁸ Indeed, an increasing number of states have

153. See, e.g., Liability Convention, *supra* note 60, pmb1. (noting in the first clause of the preamble that the state parties “[r]ecogniz[e] the common interest of all mankind in furthering the exploration and use of outer space for peaceful purposes”); Outer Space Treaty, *supra* note 49, pmb1. (noting the state parties “[b]eliev[e] that the exploration and use of outer space should be carried on for the benefit of all peoples”).

154. *Space Law Treaties and Principles*, UNITED NATIONS OFF. FOR OUTER SPACE AFFS., <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html> [<https://perma.cc/5ZFB-H22Q>].

155. See St. John, *supra* note 5, at 688 (“If space debris is left unchecked, scientists worry that low Earth orbit will become unusable.”).

156. Outer Space Treaty, *supra* note 49, art. I.

157. *Id.* art. II.

158. See Megan McCauley, Comment, *Astro-Not? How Current Space Treaties Could Fall Short of Protecting Future Space Tourists*, 50 U. PAC. L. REV. 453, 484-85 (2019) (citing Jason Krause, *The Outer Space Treaty Turns 50. Can It Survive a New Space Race?*, ABA J. (Apr. 2017), http://www.abajournal.com/magazine/article/outer_space_treaty) (noting that one scholar has argued that “the development of national regulatory systems for space activities may be a better alternative than adding to or amending the current treaty regime because of the difficulty of obtaining widespread support for one harmonized policy, in light of the multitude of interests in play”); Zhao, *supra* note 7 (“[N]ational space legislation can also

passed national legislation to govern the space operations of companies in their jurisdiction.¹⁵⁹ For example, many States with national space legislation have indemnification mechanisms that require a company to reimburse the state for at least a portion of the damage for which the state is held liable under the Liability Convention.¹⁶⁰ In other words, States can pass national legislation requiring spacefaring companies to pay some of the damage caused by their space objects, thus filling in a significant gap of the Liability Convention.

In addition, supporters of the current regime will point out that injured parties may pursue legal remedies in municipal courts.¹⁶¹ The Liability Convention does not preclude injured parties from filing lawsuits in the domestic courts of the launching state,¹⁶² and these lawsuits would likely invoke that country's tort laws to remedy the damage.¹⁶³ As such, injured parties have an alternative forum in which to dispute their claim if they prefer to avoid working through their national government in the Liability Convention process.¹⁶⁴ Some see this provision of the Liability Convention as providing adequate flexibility for parties damaged by a company's space objects.

While national legislation can effectively fill some gaps of the Liability Convention, this Note prefers an international effort because it would create a more stable and inclusive liability process. First, flag states in the space industry could seriously undermine

provide a useful attempt in providing rules for space commercialization.”).

159. MASSON-ZWAAN & HOFMANN, *supra* note 42, at 48-50; *see also* Dempsey, *supra* note 20, at 5 (“The rapid emergence of national space legislation is the fastest growing area of Space Law.”).

160. Von der Dunk, *supra* note 8, at 424.

161. St. John, *supra* note 5, at 699 (“If a party needs more certainty than the Liability Convention’s claims process can provide, the treaty structure allows injured parties to assert claims in other venues.”).

162. Liability Convention, *supra* note 60, art. XI, ¶ 2 (“Nothing in this Convention shall prevent a State, or natural or juridical persons it might represent, from pursuing a claim in the courts or administrative tribunals or agencies of a launching State.”). However, parties may not simultaneously pursue claims in multiple venues. *Id.* (“A State shall not, however, be entitled to present a claim under this Convention in respect of the same damage for which a claim is being pursued in the courts or administrative tribunals or agencies of a launching State.”).

163. Ernest, *supra* note 84, at 506.

164. *See* Liability Convention, *supra* note 60, art. XI, ¶ 2.

humanity's ability to explore and develop outer space.¹⁶⁵ A unified international liability regime for the space industry is the most direct manner by which to prevent flag states and stabilize the global space industry.¹⁶⁶ Second, an international regime would reflect the shared interests of all humankind in exploring and developing space.¹⁶⁷ Whereas a national regime leads to liability policies that benefit only the spacefaring entities of that nation, an international regime based on discussion and compromise by the international community would create a liability regime that works for every party.¹⁶⁸

Third, victim parties may prefer to avoid the domestic courts of the launching party.¹⁶⁹ Indeed, national courts may take a biased approach to adjudicating a dispute in favor of the domestic party.¹⁷⁰ An international liability forum therefore should be available to victim parties to protect them from biased national institutions of the launching party. Consequently, the international community should modernize the liability regime in outer space through a global and inclusive process.

As such, because creating a new treaty is a time-consuming and difficult process, amending the Liability Convention is the most desirable means to effectuate an international liability regime.¹⁷¹ While the private space industry may push some States to oppose amendment, "international agreements have been success[fully negotiated] in many other areas of law."¹⁷² With extensive negotiation and strong political will, the parties to the Liability Convention can trigger Article XXV and effectively amend the international

165. *See supra* Part III.B.

166. *See supra* Part III.B.

167. *See supra* notes 154-58 and accompanying text.

168. *See supra* notes 154-58 and accompanying text.

169. *See Ernest, supra* note 84, at 540 (noting that national courts may develop a "biased treaty interpretation").

170. *Id.*

171. *See Mitchell, supra* note 149, at 448 (calling the process of creating a new international treaty "a slow and arduous process" and "likely to move too slowly to meet imminent needs").

172. *Id.* at 449. For example, the Antarctic Treaty has successfully governed international activity in Antarctica, "fostering peaceful and joint scientific" endeavors in the area. *Id.* at 450.

liability regime to account for the rise of the private space industry.¹⁷³

B. Hold Companies Directly Liable

This Note further proposes that the international community amend the Liability Convention to hold companies directly liable for damage caused by their space objects. In other words, a party injured by a foreign company's space object should have the opportunity to hold that company directly liable for the damage, rather than having to hold that company's national government liable. This amendment would streamline the liability process and ensure that parties are held liable for damage they cause.

Today's major spacefaring companies have the financial position to take direct responsibility for their operations. These companies are financially lucrative, with increasing profit margins¹⁷⁴ and "[s]ky [h]igh" valuations.¹⁷⁵ A recent report estimates that the global space industry will generate revenue of \$1.1 trillion or more in 2040, up from \$350 billion in 2019.¹⁷⁶ Private investment in space companies hit a record high in 2019, with investment expected to continue its growth trajectory.¹⁷⁷ Some analysts anticipate more private space companies entering the public markets in the coming years, giving these companies new sources of capital.¹⁷⁸ Moreover, experts signal that big business has recently taken to investing in the space

173. Article XXV of the Liability Convention governs the amendment process. Liability Convention, *supra* note 60, art. XXV.

174. See Brian Wang, *SpaceX Operating Margin on Rockets Increasing by over 10% to 74%*, NEXTBIGFUTURE (Dec. 4, 2018), <https://www.nextbigfuture.com/2018/12/spacex-operating-margin-on-rockets-increasing-by-over-10-to-over-80.html> [<https://perma.cc/LN9L-SM5R>].

175. Trefis Team, *What's Driving SpaceX's Sky High Valuation?*, FORBES (May 30, 2018, 3:35 PM), <https://www.forbes.com/sites/greatspeculations/2018/05/30/whats-driving-spacex-sky-high-valuation/#4451b478bde9> [<https://perma.cc/FA3E-AP4R>].

176. *Why Big Business Is Making a Giant Leap into Space*, *supra* note 32.

177. Michael Sheetz, *Space Companies Raised a Record \$5.8 Billion in Private Investments Last Year*, CNBC (Jan. 14, 2020, 12:53 PM), <https://www.cnbc.com/2020/01/14/space-companies-including-spacex-raised-5point8-billion-in-2019.html> [<https://perma.cc/MZ7C-LLX5>].

178. *Id.* ("Investors are steadily becoming more interested in the space economy, especially as some of these private space companies edge closer to the public markets.")

industry.¹⁷⁹ Taken together, these factors indicate that the private space industry is no longer a fledgling industry, but rather a mammoth industry in the early days of its golden years. As such, spacefaring companies are able to take financial responsibility for damage caused by their space objects.

Moreover, an international regime imposing liability directly on spacefaring companies would create more efficiency and certainty for these companies, which ultimately benefits their business operations. Indeed, this amendment would allow the victim party to bypass the convoluted process of entreating its national government to file a claim and negotiate it with the national government of the launching company.¹⁸⁰ Rather, the victim party could work directly with the company whose space object caused the damage, thus reducing the transaction costs of the claim.¹⁸¹ Furthermore, direct imposition of liability on companies would avoid the difficulties of identifying which launching state to hold liable in an event similar to that illustrated in Part III.A.¹⁸² The parties would not be forced to debate ancillary procedural issues, but instead could immediately dispute the merits of the claim. Therefore, this amendment would be good for business: spacefaring companies would spend less time and fewer resources on legal formalities.

Supporters of the current liability regime, however, note that it has several benefits. First, by holding the launching state internationally liable, the regime ensures that the victim will be compensated because states have sufficiently large treasuries to pay the enormous costs related to space object damage.¹⁸³ By ensuring that

179. *Why Big Business Is Making a Giant Leap into Space*, *supra* note 32 (“While space retains an undeniably speculative aspect, especially around development of business models, a number of factors are coming together now to suggest that big business’s foray into space is here.”).

180. *See* VAN TRAA-ENGELMAN, *supra* note 136, at 347 (“[I]t is evident that private parties are still dependent on the willingness and cooperation of States to initiate action in order to materialize claims accommodated by the Liability Convention.”).

181. *See id.*

182. *See supra* Part III.A.

183. St. John, *supra* note 5, at 711-12 (“The treaties made states responsible for damage because states had deep enough coffers to pay the extraordinary costs for a space-related disaster.”).

compensation is available, this regime nominally protects victim parties.¹⁸⁴

Second, many argue that the favorable national space legislation that numerous States have adopted is necessary for continued private space industry development.¹⁸⁵ Indeed, some States with indemnification procedures cap the potential liability of the spacefaring companies.¹⁸⁶ For example, the United States requires spacefaring companies to purchase liability insurance before obtaining a license to launch.¹⁸⁷ The Department of Transportation determines the required coverage amount for each launch, but federal law caps this amount at \$500 million per launch.¹⁸⁸ If the space object causes damage that exceeds the required coverage amount, the United States will pay the remainder—up to \$1.5 billion.¹⁸⁹ In effect, the government shares liability risk with the companies by capping their potential liability to third parties.¹⁹⁰ This liability cap protects spacefaring companies from facing massive liability damages, which, many argue, is crucial for the development of the private space industry.¹⁹¹

This Note concludes that, while these arguments may have been effective in the early days of the commercial space industry, they no longer prove controlling. The private space industry has rapidly matured in recent years.¹⁹² Spacefaring companies are generating increasing profit margins and are attracting unprecedented levels of investment.¹⁹³ As such, spacefaring companies no longer require

184. *See id.*

185. Matthew Schaefer, *The Need for Federal Preemption and International Negotiations Regarding Liability Caps and Waivers of Liability in the U.S. Commercial Space Industry*, 33 *BERKELEY J. INT'L L.* 223, 273 (2015) (“Recognizing the importance of the growing commercial space industry to U.S. national security and the national economy, enhanced liability protections should be afforded to the nascent industry to avoid ‘crushing liability’ on U.S. space companies.”); *see also* Dempsey, *supra* note 20, at 43 (“During the embryonic and developmental period of commercial space activity, liability [of the companies] should be capped.”).

186. Albert, *supra* note 6, at 249.

187. Mitchell, *supra* note 149, at 446.

188. *Id.*

189. *Id.*

190. *See id.*

191. *See, e.g.*, Dempsey, *supra* note 20, at 43.

192. *See supra* Part I.

193. *See supra* notes 176-80 and accompanying text.

financial insulation from liability by the government. The time has come to streamline the liability process and hold these companies directly liable for any damage that their space objects cause.

C. What Would This New Regime Look Like?

While the mechanisms of this new liability regime are largely beyond the scope of this Note, the establishment of an international space tribunal is one potential method by which the international community can respond to the issues depicted in this Note. Many scholars have advocated for the creation of a permanent tribunal to adjudicate claims related to international activity in outer space.¹⁹⁴ Such a tribunal could be modeled after other international adjudicatory agencies, like the European Court of Human Rights.¹⁹⁵ Under this model, any party—a state, company, individual, or otherwise—that suffers damage by a space object could file a claim with the international space tribunal.¹⁹⁶ The tribunal would then use applicable space treaties, international custom, and general principles of international law to adjudicate the claim and assign liability for the damage.¹⁹⁷ The tribunal would not distinguish between public or private entities when making this adjudication.¹⁹⁸

An international space tribunal could have several benefits. First, judges on the tribunal would develop expertise in complex, space-related technicalities, which would ensure that claims are adjudicated fairly and accurately.¹⁹⁹ Second, the tribunal would consist of judges from numerous countries, which would prevent biased treaty interpretation and protect parties from inequitable rulings.²⁰⁰ Third, a specialized tribunal would make damage awards more predictable,

194. Ernest, *supra* note 84, at 539 (suggesting the creation of an international tribunal to “resolve disputes in accordance with proposed outer space treaty provisions, ‘international custom,’ and ‘general principles of the law of civilized nations,’” but acknowledging that such a solution may be unworkable (footnotes omitted)); Taghdiri, *supra* note 44, at 429 (suggesting that an international space tribunal that deals “exclusively with space-related accidents” would mitigate the problems associated with flag states).

195. Taghdiri, *supra* note 44, at 429.

196. *See id.*

197. *Id.*

198. *Id.*

199. *See* Ernest, *supra* note 84, at 539-40.

200. *See id.*

allowing launching entities to structure their operations more efficiently.²⁰¹ Thus, the international community could benefit from the creation of an international space tribunal.

An international space tribunal, however, could have unintended consequences for the international community. For instance, such a tribunal could increase the transaction costs of filing a claim.²⁰² Because the tribunal would adopt its own processes and procedures, litigating before it would become more complex than simply litigating before a domestic court.²⁰³ Parties could be reluctant to pursue a claim in the international forum due to these higher transaction costs.²⁰⁴ An international space tribunal, therefore, may have significant drawbacks.

The creation of an international space tribunal would radically change the process by which international claims for space object damage are resolved.²⁰⁵ As such, this Note encourages future scholarship pertaining to the establishment of a permanent international space tribunal.

CONCLUSION

The space industry is rapidly changing. An industry that was once controlled by nation-states competing to explore the outer reaches of space has become increasingly dominated by spacefaring companies.²⁰⁶ These companies are changing the rules of the game in countless ways and have worked to make space more accessible for both public and private entities.²⁰⁷ As a result, space activity has skyrocketed—and will continue to skyrocket—as companies seek to capture the benefits of outer space.²⁰⁸ With an increased use of space objects comes a corresponding increase in the risk of these objects causing damage.²⁰⁹

201. See Taghdiri, *supra* note 44, at 429.

202. Ernest, *supra* note 84, at 540.

203. *Id.*

204. See *id.*

205. See *id.* at 539.

206. Bennett, *supra* note 1, at 63.

207. See, e.g., *About SpaceX*, *supra* note 2.

208. See Lavender, *supra* note 4.

209. St. John, *supra* note 5, at 688.

Yet, the law governing international liability for space object damage has remained shockingly stagnant since its inception in the 1960s and early 1970s. The Liability Convention has not been amended or updated since its creation in 1972, and its state-centric procedures have become increasingly outdated in a modern space industry dominated by the private sector.²¹⁰

Consequently, numerous issues arise when the Convention is applied to spacefaring companies. First, the Convention's definition of "launching state" creates problems identifying which state should be considered the launching state of a space object when multiple states satisfy the Convention's requirements.²¹¹ If one state could technically be on both sides of the dispute, how is the issue resolved? Second, the Liability Convention fails to establish uniform liability standards, which has led to the development of national standards and, ultimately, the problems associated with flag states in the space industry.²¹² Third, the terms of the Liability Convention are largely weak and ineffective when applied to companies.²¹³ The Convention places too much weight on good-faith negotiations between the parties, which creates uncertainty as to whether a dispute can adequately be resolved.²¹⁴

As such, this Note proposes a two-part solution to bring the Liability Convention into the modern age. First, the global community should amend the Convention in a wide-ranging, international effort.²¹⁵ International cohesion is required to properly address the concerns discussed in this Note, such as the problems associated with having a patchwork of national laws regulating the space industry.²¹⁶ Consequently, the parties to the Convention should invoke its amendment process set forth in Article XXV.²¹⁷

Second, the Liability Convention should be amended to assign liability directly on companies whose space objects have damaged an

210. See Albert, *supra* note 6, at 244.

211. See *supra* Part III.A.

212. See *supra* Part III.B.

213. See *supra* Part III.C.

214. See *supra* Part III.C.

215. See *supra* Part IV.A.

216. See *supra* Part IV.A.

217. See Liability Convention, *supra* note 60, art. XXV.

international party.²¹⁸ These spacefaring companies no longer require insulation from liability by their national governments: the companies have the financial position necessary to take responsibility for their operations.²¹⁹ Furthermore, by removing national governments from the process, this amendment would create a streamlined and more efficient liability process for companies, which, ultimately, is good for business.²²⁰

While the procedures of this new international liability regime are beyond the scope of this Note, the prospect of establishing a permanent international space tribunal is a particularly intriguing solution, and this Note encourages further scholarship on the topic.²²¹ Nevertheless, the international community should rewrite the rules governing liability in space to reflect modern realities. It is time to amend the Liability Convention to assign liability directly on companies operating in outer space.

*Alexander P. Reinert**

218. *See supra* Part IV.B.

219. *See supra* Part IV.B.

220. *See supra* Part IV.B.

221. *See supra* Part IV.C.

* J.D. Candidate 2021, William & Mary Law School; B.A. 2018, Political Science & Economics, University of Tulsa. I would like to thank all the fantastic *William & Mary Law Review* staff who helped me write and edit this Note, especially Matthew Catron, Andrew Pardue, and Davis McKinney. Thank you also to Professor Stacy Kern-Scheerer and Tessa Tilton for making legal writing fun and engaging. Most importantly, I am immensely grateful to my family and friends for their constant support and encouragement.