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# The Sea of the Universe: How Maritime Law's Limitation on Liability Gets it Right, and Why Space Law Should Follow by Example

RACHEL ROGERS

## ABSTRACT

*“Space law,” much like outer space itself, still remains largely un-navigated in some aspects. “Space law” is a term loosely used to dictate the body of law that refers to the international rules and regulations surrounding exploration and behavior while in outer space; while it quite uniformly covers questions of general damage control, international relations, and resource exploration, some areas of this body of law remain ambiguous and only partially implemented across the globe. One of these broad areas is the role of tort law in outer space—liability stemming from spacecraft collision and the resulting damage that occurs between the countries. This paper argues that since space law shares many similarities with maritime law, the law of the seas, certain maritime law regulations should be adopted. Maritime law has traditionally implemented the practice of limitation on liability since the passage of the Limitation of Liability Act, 46 U.S.C. §§ 181-196—a set of statutes that limits the liability of a defendant in a tort claim when damage has occurred to a ship, cargo vessel, or other related craft while at sea. Despite best efforts and careful planning, expensive accidents can still occur on land, while at sea, and now, with more frequent travel to outer space, the skies and beyond. To continue to encourage space exploration and research, nations should follow the longstanding example set out by maritime law in following limitations on liability. Extending a codified limitation on liability to space law will help pave the way for increased space exploration in the years to come. This measure will limit liability and thus the total amount of money a defendant might owe at the outcome of a collision settlement. This defendant will be in a better financial position to increase safety measures for continued exploration. Moreover, the window would be widened for other potential spacefarers who might have been wary at any associated costs with space travel and who would no longer need to*

*worry about full liability were something to go wrong. The Limitation of Liability Act should be incorporated into space law to increase the presence of those already utilizing channels of space for both commercial and research purposes and to encourage new voyagers to the land beyond without quite the same hefty price tag attached.*

## INTRODUCTION

The former Union of Soviet Socialist Republics (USSR) launched the satellite Sputnik 1 successfully into outer space on October 4, 1957. The space race that ensued was seemingly inevitable and gave rise not only to the multitude of programs and launches set by the National Aeronautics and Space Administration (NASA) today but also got the ball rolling for the international set of regulations collectively referred to as “space law.”<sup>1</sup> As a vein of international law, space law concerns more than just one nation and calls the United Nations (U.N.) to convene whenever a larger question of outer space interests arises, such as territorial claiming or damage control.<sup>2</sup> This set of rules and regulations defining space law and setting its boundaries can be found in five key treaties, all drafted by the United Nations Committee on the Peaceful Uses of Outer Space.<sup>3</sup>

This paper is chiefly concerned with what the aforementioned U.N. subcommittee refers to as “The Liability Convention,” a set of propositions and arguments concerning the liability of a launching state when damage is caused in outer space.<sup>4</sup> All arguments and research pertaining to liability presented by the subcommittee were taken under consideration from 1963 until 1972 when a decision was finally made and signed into action, almost a decade after the advisory forum was initially opened.<sup>5</sup> The lasting effects of the General Assembly’s decision have remained largely unchanged. Any damage that has been caused by a state’s launched object leaves the state fully liable to pay for any

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1. See generally *Sputnik: The Fiftieth Anniversary*, NASA (Oct. 10, 2007), <https://history.nasa.gov/sputnik/> (describing the launch of the very first satellite into outer space and its lasting effects); *Space Law*, MILNER & MARKEE, LLP, <https://www.milner-markee.com/space-law/> (last visited Jan. 29, 2019).

2. See G.A. Res. 2777 (XXVI), Convention on International Liability for Damage Caused by Space Objects, at 25 (Mar. 29, 1972).

3. See *Space Law Treaties and Principles*, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, <http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html> (last visited Jan. 29, 2019).

4. See G.A. Res. 2777, *supra* note 2, at 25.

5. See Convention on International Liability for Damage Caused by Space Objects, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, <http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introliability-convention.html> (last visited Jan. 29, 2019).

resulting damages from the collision.<sup>6</sup> While there has not been much need for constant exercise of the treaty's stipulations, a brief case study of the crash of a Soviet satellite Cosmos 954 into Canadian territory and the resulting liability will showcase the potential drawbacks of full liability.<sup>7</sup>

This paper will then compare the full liability standard of space law tort practices with another similar body of law, "maritime law," and its practices in limiting liability. "Maritime law," the international body of law governing transport by sea, shares some similarities with space law, although some of its practices, such as limiting vessel owner liability, are wildly different.<sup>8</sup> Maritime law has unquestionably been around much longer than space law has; similarly, most of human civilization is most familiar with travel by sea rather than travel towards the heavens. The familiarity with sea travel and measured comfort with sea vessels is evident in the long-standing body of maritime law—we as society have grown so accustomed to the intricacies of sea travel that we have worked to provide a working set of rules for every aspect of sea travel and protection available. The number of treaties and conventions speaking specifically on maritime law completely dwarfs the conversations, limited understandings, and regulations on space travel and liability.<sup>9</sup>

Finally, this paper concludes by suggesting that to better understand space travel, we need to be getting out there more, just as our forefathers did when the seas and long-distance sea travel were still an unrealized beast. This paper ultimately makes the argument that space travel may best be realized and treaties may be properly expanded upon in due time once space travel has been made more widely available, and an informed way to do this is to limit states' liability for collisions or other damages caused by an exploratory crash. This proposition is drawn from the similarities between maritime law and space law—while maritime law has, over time, made the informed

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6. G.A. Res. 2777, *supra* note 2, at 25.

7. See generally *Nation: Cosmos 954: An Ugly Death*, TIME (Feb. 6, 1978), <http://content.time.com/time/magazine/article/0,9171,945940,00.html> (providing background information about the Cosmos 954 crash and the subsequent damage that resulted).

8. See NORMAN A. MARTINEZ GUTIERREZ, LIMITATION OF LIABILITY IN INTERNATIONAL MARITIME CONVENTIONS 63-67 (2011); Hamilton DeSaussure, *Maritime and Space Law, Comparisons and Contrasts (an Oceanic View of Space Transport)*, 9 J. SPACE L. 93, 93-96 (1981).

9. See generally *International Conventions*, ADMIRALTY & MARITIME LAW GUIDE, <http://www.admiraltylawguide.com/interconv.html> (last visited Jan. 29, 2019) (providing a measured guide of every convention, decision, and standing treaty from the United Nations regarding international maritime law).

decision to codify a limitation on liability for owners of vessels that have caused damage, collisions under the same circumstances should be codified in space law.<sup>10</sup> Outer space, just like the seas, may best be explored when the window for travel is widened and restrictions are safely lowered—this may be done safely through a limitation of liability as evidenced through maritime law’s long-standing practice.<sup>11</sup>

#### THE SPACE RACE, HUMBLE NASA BEGINNINGS, AND THE FIVE SPACE LAW TREATIES

The calm at the end of World War II was, in many ways, just the calm before another storm—the Cold War. The Cold War is perhaps best recalled as a quasi-technological arms race between the United States and the former Soviet Union.<sup>12</sup> The year 1957 celebrated the launch of the first satellite, the Soviet Sputnik, into outer space; not to be outdone, the United States quickly sent its own satellite to outer space in the following year.<sup>13</sup> The launch of the American satellite, the Explorer I, was quickly followed by President Dwight D. Eisenhower signing into power NASA.<sup>14</sup> While the multilateral treaties were not ratified until about a decade later, President Eisenhower’s signing of the National Aeronautics and Space Act in 1958, alongside the formation of NASA, began the space law conversation about the bigger issues implicated on a new plane of exploration.<sup>15</sup>

While the fears and insecurities of the Cold War left much to be desired, the 1958 Act opened a floodgate for interest in space travel, as well as a demand for bright minds to cover many aspects of space exploration and research that had not yet been fully considered, including how law might work thousands of miles above the clouds.<sup>16</sup>

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10. MARTINEZ GUTIERREZ, *supra* note 8; DeSaussure, *supra* note 8, at 94.

11. See United Nations International Convention Relating to the Limitation of the Liability of Owners of Sea-Going Ships, and Protocol of Signature, art. 1, Oct. 10, 1957, 1412 U.N.T.S. 81, 81-82.

12. See generally *The Space Race*, HISTORY, <http://www.history.com/topics/space-race> (last updated Sep. 13, 2018) (providing a detailed timeline and description of how the space race began, the parties involved, and general international ramifications).

13. *Id.*

14. *Id.*

15. See Tony Long, *July 29, 1958: Ike Inks Space Law, NASA Born in Wake of Russ Moon*, WIRED (July 29, 2010, 12:00 AM) <https://www.wired.com/2010/07/0729eisenhower-signs-nasa-act/>; see generally Phillip R. Harris, *Space Law and Space Resources*, NATIONAL SPACE SOCIETY, <http://space.nss.org/settlement/nasa/spaceresvol4/spacelaw.html> (last visited Jan. 29, 2019) (discussing space law problems and complexities).

16. See generally *Domestic Space Law*, SPACE POLICY ONLINE <https://spacepolicyonline.com/topics/space-law/> (last updated Nov. 14, 2018) (listing a timeline for

What may have started out as a smaller-scale, anxiety-inducing competition of wits and technology between two powerhouse countries quickly became a grandiose, internationally recognized and regulated conversation among the participant countries of the United Nations.<sup>17</sup> To date, the United Nations has implemented five treaties specifically regulating space travel, exploration, and duties between states while in outer space.<sup>18</sup>

As the competitive nature of the Space Race dwindled down and the Cold War began to freeze over, so did the growth of new and drastically edited treaties in the realm of U.N.-regulated space law.<sup>19</sup> To date, the United Nations only has five treaties specifically regulating space law in effect: the Outer Space Treaty, the Rescue Agreement, the Liability Convention, the Registration Convention, and the Moon Agreement.<sup>20</sup> The ratification of these treaties moved at a somewhat elevated pace with all five being signed into effect within about a fifteen-year time span from the 1960s to the 1980s.<sup>21</sup> There has not been a drastic overhaul nor any new additions to the list of treaties in the last thirty years, and the core values laid out by this initial rapid-fire of treaty ratification that shortly followed the Space Race remain relatively unchanged.<sup>22</sup>

The Outer Space Treaty, entered into force on October 10, 1967, and since ratified by ninety-eight states, was the first treaty of its kind in the space law treaty series.<sup>23</sup> This treaty permits exploration and continued research of outer space so long as such study and travel are for “the benefit” of all countries party to the treaty and in the general

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treaties and acts that followed the creation of NASA to fill in any gaps that the initial 1958 act had not considered).

17. See generally Elizabeth Howell, *Who Owns the Moon? Space Law & Outer Space Treaties*, SPACE.COM (Oct. 27, 2017, 9:00 AM), <https://www.space.com/33440-space-law.html> (showing the framework for the five core treaties regulating space law between countries party to the United Nations).

18. *Domestic Space Law*, *supra* note 16.

19. See HISTORY, *supra* note 12; see generally Jason Krause, *5 United Nations Treaties in Outer Space*, ABA JOURNAL, Apr. 2017, [http://www.abajournal.com/magazine/article/space\\_law](http://www.abajournal.com/magazine/article/space_law) (displaying a brief timeline of the five U.N. space law treaties, noting that the last one went into effect in 1984, which was more than thirty years ago).

20. Krause, *supra* note 19.

21. See Howell, *supra* note 17.

22. See JEAN-LUC LEFEBVRE, SPACE STRATEGY 273-75 (2017); see generally General Assembly Resolutions and Treaties Pertaining to the Peaceful Uses to Outer Space, THE UNITED NATIONS, [http://www.unoosa.org/pdf/gares/ARES\\_62\\_217E.pdf](http://www.unoosa.org/pdf/gares/ARES_62_217E.pdf) (last visited Nov. 9, 2018) (describing the core values and mission statement of the U.N.’s development of the five treaties and intended effects of space exploration as a result).

23. See *Domestic Space Law*, *supra* note 16; Edwin W. Paxson III, *Sharing the Benefits of Outer Space Exploration: Space Law and Economic Development*, 14 MICH. J. INT’L L. 486, 489-92 (1993).

interests of mankind.<sup>24</sup> The treaty further specified that all of outer space was open for exploration by any countries party to the treaty, underlined a specific intent to maintain peace throughout all of outer space, and began to fashion an initial liability standard for any damage caused by any country party to the treaty while exploring outer space.<sup>25</sup> To match this attitude of keeping individual countries fully liable for their actions as well as in the interest of maintaining the peace while exploring outer space, the treaty further disallows any kind of manmade nuclear activity to occur in outer space as well as any kind of toxic contamination to the heavens or other “celestial bodies” while exploring.<sup>26</sup>

The second space law treaty, enacted in December of 1968, is the “Rescue Agreement.”<sup>27</sup> The Rescue Agreement specifically addresses worries with space travel (most notably with returning astronauts to Earth) that had been voiced nearly a decade earlier during the great Space Race debacle.<sup>28</sup> The agreement further outlines that all countries party to the treaty have a duty to return or assist in the return of an astronaut or other space traveler to the launching country to the best of their ability when return conditions have somehow prevented the traveling party from safely returning to the launching country as originally planned.<sup>29</sup> Further, upon request of the launching party, all countries party to the treaty have a duty to assist in returning any objects that have followed the traveling party back from space but for some outstanding circumstance have not landed in the launching territory alongside the returning party.<sup>30</sup>

The third of the five space law treaties, and the focal point of this paper, is the Liability Convention, a treaty that was put into force on September 1, 1972.<sup>31</sup> The Liability Convention will be explored in more depth shortly, but as a brief introduction, this treaty essentially established full liability to one country for any damage caused by accidents occurring in outer space.<sup>32</sup> Interestingly, the Liability

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24. See G.A. Res. 2222 (XXI), Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, at 13 (Jan. 27, 1967).

25. *Id.* at 13-14.

26. *Id.* at 14.

27. See G.A. Res. 2345 (XXII), Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, at 5 (Dec. 3, 1968).

28. See Frans G. von der Dunk, *A Sleeping Beauty Awakens: The 1968 Rescue Agreement After Forty Years*, 34 J. SPACE L. 411, 412-15 (2008).

29. G.A. Res. 2345, *supra* note 27, at 6.

30. *Id.*

31. G.A. Res. 2777, *supra* note 2, at 25.

32. *Id.*

Convention was one of the longest-running treaties up for debate—arguments were considered and research was presented over a span of nearly a decade from 1963 until its enforcement in 1972.<sup>33</sup> The Liability Convention further established guidelines through which countries may reach a settlement agreement once a claim for damages has properly been filed following the travel incident.<sup>34</sup>

The fourth space law treaty, the “Registration Convention,” was ratified and enforced on September 15, 1967.<sup>35</sup> The Registration Convention is somewhat of a combination of all of the previous treaties and creates a system through which parties to the convention might be able to identify or distinguish certain space objects from one another.<sup>36</sup> This treaty not only expanded upon the duties of liable parties when coming into contact with any space object but sought to provide a common register through which all treaty countries might refer to when seeking to properly identify any space objects.<sup>37</sup>

Finally, the most recent of the space treaties, though dated by more than thirty years and enforced on July 11, 1984, is the “Moon Agreement.”<sup>38</sup> This final addition to the series of space law treaties essentially works to reaffirm all previous entries by specifically applying conditions such as peacefulness, good safety practices, and a strict liability standard to all behaviors in relation to, or taking place on the moon.<sup>39</sup> Further, this treaty established that the resources of the moon do not belong to just a single nation of Earth and noted that a governing committee should be implemented to dictate who may exploit which resources and when once exploitable resources have been discovered.<sup>40</sup> Following this, the United Nations also noted that any kind of building or habitation crafted by man on the moon needed to be reported to treaty parties immediately to record any disruptions to the surface of

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33. *Convention on International Liability for Damage Caused by Space Objects*, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, <http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introliability-convention.html> (last visited Jan. 29, 2019).

34. *Id.*

35. UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, *supra* note 3.

36. *See The Convention on Registration of Objects Launched Into Outer Space*, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS (last updated Aug. 2017), <http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introregistration-convention.html>.

37. *See* G.A. Res. 3235 (XXIX), *The Convention on Registration of Objects Launched Into Outer Space*, at 16 (Sept. 15, 1976).

38. UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, *supra* note 3.

39. *See Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS (last updated Aug. 2017), <http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/intromoon-agreement.html>.

40. *See* G.A. Res. 34/68, *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, at 79 (Dec. 18, 1979).



the moon.<sup>41</sup>

While each of the core five treaties has had lasting impact on the way Earth's citizens explore outer space today, the main focus of this paper will be on the Liability Convention, its lasting and limiting effects, and its divergence from an arguably near-identical body of law—maritime law.<sup>42</sup>

#### A BRIEF STUDY IN MARITIME LAW

Maritime law, interchangeably referred to as admiralty law, is defined as “a body of laws, conventions, and treaties that govern private maritime business and other nautical matters, such as shipping or offenses occurring on open water.”<sup>43</sup> Travel by foot and carriage-and-buggy aside, travel by sea is one of the oldest, most tried-and-true forms of transportation. Seafaring voyages for conducting business between countries as well as for other less-genuine purposes, such as pirating, has been under legal regulation since as early as 900 B.C., back to the days of the first Rhodian Sea Laws.<sup>44</sup> It should be noted that maritime law is distinctively different, if only slightly, from what is referred to as the “Law of the Sea”—a body of international law dealing chiefly with the public sphere of navigation and jurisdiction over certain bodies of water.<sup>45</sup> For the purposes of this paper, only maritime law will be considered in tandem with space law, specifically maritime law's treatment of liability.

The net cast by maritime law is wide—such a specific sect of law that covers international private business at sea, as well as a wide range of criminal activity, warrants having a set of regulations to deal with damage control in case something were to go wrong on open water.<sup>46</sup> When something does go awry at sea, such as a collision with another ship, a spill into the harbor, or damage caused by a

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41. *Id.*

42. See generally Wayne White, *The Legal Regime for Private Activities in Outer Space*, SPACE FUTURE (Mar. 15, 2001) [http://www.spacefuture.com/archive/the\\_legal\\_regime\\_for\\_private\\_activities\\_in\\_outer\\_space.shtml](http://www.spacefuture.com/archive/the_legal_regime_for_private_activities_in_outer_space.shtml) (drawing several broad comparisons between admiralty law and space law on a basic level in determining how private activity where no government currently exists might be regulated from Earth).

43. See *Maritime Law*, INVESTOPEDIA, <https://www.investopedia.com/terms/m/maritime-law.asp>. (last visited Jan. 20, 2019).

44. See Hailegabriel Gedecho, *Historical Development of Maritime Law*, ABYSSINIA LAW (July 20, 2013) <http://www.abyssinialaw.com/study-on-line/item/1072-historical-development-of-maritime-law>.

45. See United Nations Convention on the Law of the Sea, *opened for signature* Dec. 10, 1982, 1833 U.N.T.S. 7 (entered into force Nov. 16, 1994).

46. See *Maritime Law*, *supra* note 43.

swashbuckling pirate, the party that caused the damage usually finds themselves faced with a hefty bill as a result. Assessing liability for damages caused by vessel interference has a long history with maritime law, and limiting the liability of a responsible party was notably addressed in the 1976 Convention on Limitation of Liability for Maritime Claims.<sup>47</sup> Limiting the liability of a vessel owner responsible for a wreck has long been a treasured hallmark of seafaring history—it not only has historical value, but limitations on liability in maritime law seek to protect the owner at fault from being responsible for an inordinate amount of damages that may have been unforeseen at the time of the collision.<sup>48</sup>

The 1976 Convention made particularly great sweeps in changing the previously low limits for sailors and ship owners left with an exorbitant bill at the scene of an accident; not only did the convention greatly increase the limit and calculation method to account for the changing shapes and weights of ships due to new materials being used, but it further broadened who may be eligible to file for limiting their liability to include a larger group of claimants.<sup>49</sup> The policy effects were almost instantaneous once fully rolled out—seafarers enjoyed greater access to a forum in which to state their case for limitation, and the great monetary disparity between the original limitation of funds from the 1957 Convention and its calculations as compared to the increased funding and generous calculations of the 1976 Convention were made readily available for public perusal.<sup>50</sup>

The holding of the convention, still in effect today, can be originally traced back to the Limitation of Liability Act of 1851, a regulation passed in the United States that has been an anchor in American claims and a jumping off point for some international vessel disputes.<sup>51</sup> While the Limitation of Liability Act technically only applies to U.S.

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47. See Convention on Limitation of Liability for Maritime Claims, *opened for signature* Nov. 19, 1976, 1987 U.N.T.S. 222 (entered into force Dec. 1, 1986); *Limitation of Liability in International Maritime Conventions: The Relationship Between Global Limitation Conventions and Particular Liability Regimes*, INT'L MAR. L. INST., <http://www.imli.org/publications/limitation-liability-international-maritime-conventions-relationship-between-global-lim> (last visited Jan. 29, 2019).

48. See *Limitation of Liability in International Maritime Conventions: The Relationship Between Global Limitation Conventions and Particular Liability Regimes*, *supra* note 47.

49. Convention on Limitation of Liability for Maritime Claims *supra* note 47.

50. See STEAMSHIP MUTUAL, THE EFFECTS ON LIMITATION OF LIABILITY OF THE 1976 LIMITATION CONVENTION AND THE 1969 TONNAGE CONVENTION REGULATIONS (1985), <https://www.steamshipmutual.com/pdf.htm?id=262185&pdf=true>.

51. See 46 U.S.C. § 183 (1984); *Limitation of Liability*, BLUESTEIN L. FIRM, P.A (last updated Jan. 2018), <http://www.bluesteinlawoffice.com/Maritime-Law-Articles/Limitation-of-Liability.shtml>.

jurisdictions, many similar variations exist around the world, and the 1976 Convention regulation is incredibly similar both in form and substance.<sup>52</sup> Both regulations set limits on who exactly can file a claim to limit their liability—in the most general understanding of the common ground between the two regulations, only a ship owner lacking “knowledge or privity” of the circumstances that caused the collision and subsequent destruction may begin the process for filing a claim to limit their liability for damages.<sup>53</sup> Further, while the restrictions vary between the regulations, ship owners filing a claim to limit their liability may only go so far in limitations; liability limitation is often limited based upon factors such as weight of the vessel and gives leeway to considerations such as any loss of life or other personal injury when making calculations.<sup>54</sup>

Maritime law, international and state-specific alike, has long valued protecting the rights of ship owners where no privity, no prior knowledge of negligence, or no evidence of intent to cause harm is present.<sup>55</sup> Further, these equity interests have continued to grow through the test of time—the 1996 Protocol to the Convention of 1976 increased the amount to which ship owners may limit their liability and adjusted for inflation and economic fluctuation.<sup>56</sup> While the power is ultimately up to the federal court system to decide whether or not to even hear a defense’s counterclaim to limit liability in the wake of a shipwreck or other accident at sea, the convention still offers a heavily-lined fallback plan to attempt to combat costs for the unfortunate ship

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52. United Nations Convention on the Law of the Sea, *supra* note 45; see generally Andrew Stakelum, *The Limitation of Liability Act of 1851: Recent Court Decisions Highlight Significant Issue for Offshore Energy Industry*, JD SUPRA (Jan. 13, 2017) <https://www.jdsupra.com/legalnews/the-limitation-of-liability-act-of-1851-23620/> (providing an analysis of the history and current implementation of limitation of liability, as well as providing a brief background on how it has been closely mimicked in other countries).

53. Stakelum *supra* note 52; see also Kourush Taheri, *Limitation of Liability for Maritime Claims: Multiple Perspectives and Legal Implications* 1, 17 (Sept. 6, 2013) (unpublished M.A. thesis, Lund University) (on file with Lund University Libraries).

54. See Convention on Limitation of Liability for Maritime Claims, *supra* note 47; Keith S. Brais, *The Shipowner’s Limitation of Liability Act: Pitfalls for the Unwary*, Southeastern Admiralty Law Institute, Inc., Annual Seminar at 7 (June 16-17, 2006).

55. See Convention on *Limitation of Liability for Maritime Claims (LLMC)*, INT’L MAR. ORG. <http://www.imo.org/en/About/conventions/listofconventions/pages/convention-on-limitation-of-liability-for-maritime-claims-llmc.aspx> (last visited Jan. 29, 2019).

56. See Int’l Mar. Org., *Protocol of 1996 to amend the Convention on Limitation of Liability for Maritime Claims I.L.M. 1433, 1433 (1996)*; see generally *Increased Limits of Liability Enter into Force in 2015*, GARD INSIGHT (July 8, 2014), <http://www.gard.no/web/updates/content/20741048/increased-limits-of-liability-enter-into-force-in-2015> (offering a timeline view of how the protocol has expanded liability limitations based upon the changing economy and higher tonnage of ships).

owner who objectively could not have expected a wreck to occur.<sup>57</sup> In our own generation's time, commercial space travel, following the same route as seafaring, will continue to become more accessible and practical as a means of trade transportation. Permitting ship owners to limit their liability for damages in the face of a wreck is a practice that has been upheld in many countries for centuries; officially, for nearly a hundred years, it is a practice that works in the field of ever-increasing commercial travel.<sup>58</sup> As space travel becomes more readily available in the mainstream, limiting liability should make its way to the forefront of conversation, both to bring space travel even closer to mainstream availability and to prevent disproportionate consequences from occurring as the result of unforeseen accidents in space.

#### THE TRAGEDY OF COSMOS 954 AND PREVENTING FUTURE TRAGEDIES

On September 18, 1977, the former Soviet Union launched the satellite "Cosmos 954" into orbit after reporting an intent to launch and gaining approval from the United Nations.<sup>59</sup> While the launch itself was successful during this glory period of space revolution and travel, Cosmos 954 quickly experienced technical problems while in orbit.<sup>60</sup> Technical issues arising with satellites and space vessels are especially concerning due to their structure; Cosmos 954 was not unusual in its construction and contained a nuclear reactor filled with Uranium, a universally dangerous substance unless used under the necessary and proper circumstances involved in space travel and design.<sup>61</sup> Cosmos 954 began to exhibit signs of distress and started to go off course only about two months after the launch, alerting U.N. states (and following the Space Convention)—such as Canada, the United States, and of course, the former Soviet Union—of the potential distress that an off-course satellite filled with nuclear poison might cause.<sup>62</sup> Unfortunately, the

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57. See generally *Vessel Owners Limitation of Liability Act – What is it and Will it be Limited?*, MOULEDOUX BLAND LEGRAND & BRACKET (July 20, 2011), <https://mblb.com/admiralty-maritime/vessel-owners-limitation-of-liability-act-what-is-it-and-will-it-be-limited/> (offering a realistic objective view on advantages and disadvantages of potential repeal of the Act).

58. See XIA CHEN, *LIMITATION OF LIABILITY FOR MARITIME CLAIMS: A STUDY OF U.S. LAW, CHINESE LAW, AND INTERNATIONAL CONVENTIONS*, at xvi-xvii (2001).

59. See Alexander F. Cohen, *Cosmos 954 and the International Law of Satellite Accidents*, 10 *YALE J. INT'L L.* 78, 79 (1984).

60. See *Cosmos 954 Downfalls – 2015*, ROBINDESBOIS (Jan 23, 2015), <http://www.robindesbois.org/en/les-retombees-du-cosmos-954/>.

61. See *The Nuclear Disaster of Kosmos 954*, HISTORIC WINGS (Jan. 24, 2013), <http://fly.historicwings.com/2013/01/the-nuclear-disaster-of-kosmos-954/>.

62. See *Cosmos 954 Downfalls – 2015*, *supra* note 60.

potential horrors came to fruition on January 24, 1978, when Cosmos 954 crashed back into Earth's atmosphere—leaving no room for a well-planned re-entry—and fell into Canadian waters.<sup>63</sup>

While the cleanup associated with this crash (and subsequent contamination exposure) was bad enough, the price tag attached to it was nearly as egregious. Canada ended up incurring a hefty \$6 million in cleanup and protective measure charges, a bill that was forwarded to the former Soviet Union for the entire cost—no shared liability.<sup>64</sup> The enforceability of this payment agreement, stipulating the U.S.S.R. as the sole liable party for damages, was based upon the holdings of the 1972 Liability Convention, which stipulates sole responsibility of the launching party in claims where a space object has caused damages on an international scale.<sup>65</sup> The costs to the U.S.S.R., not even considering lost reimbursement of costs that would have come through the benefits of research and new data found through the satellite launch, were devastating when looking to the amount already spent on this short-lived space survey. Launching and maintaining a satellite in orbit today costs anywhere between \$100 million and \$260 million, with \$100 million being on the low end. When adjusted down for inflation, the former Soviet Union would have spent approximately anywhere from \$20 million to \$80 million during that time period just on creating and launching this failed satellite in the first place.<sup>66</sup>

The Cosmos 954 incident is currently the only occurrence on record with the United Nations that was filed directly under the provisions of the 1972 Space Convention on Liability.<sup>67</sup> Undoubtedly, there are countless other factors more emotionally devastating that were at play during this tragedy that are distinct from just the amount of money paid by the U.S.S.R.—the nuclear waste damage, the water contamination, and the extended cleanup were all devastating drains on Canadian resources at the time.<sup>68</sup> This incident occurred forty years ago, however, just several years after the U.N. space treaty boom and on the tail end of the great Space Race.<sup>69</sup> This occurred while the Cold War

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63. *The Nuclear Disaster of Kosmos 954*, *supra* note 61.

64. *Id.*

65. *Cosmos 954 Downfalls – 2015*, *supra* note 60.

66. See Tim Fernholz, *SpaceX Just Made Rocket Launches Affordable. Here's how It Could Make Them Downright Cheap*, QUARTZ (Dec. 4, 2013), <https://qz.com/153969/spacex-just-made-rocket-launches-affordable-heres-how-it-could-make-them-downright-cheap/>.

67. Gökтуğ Karacalıođlu, *Energy Resources for Space Missions*, SPACE SAFETY MAGAZINE (Jan. 16, 2014), <http://www.spacesafetymagazine.com/aerospace-engineering/nuclear-propulsion/energy-resources-space-missions/>.

68. See *Cosmos 954 Downfalls – 2015*, *supra* note 60.

69. See generally Krause, *supra* note 19 (providing a timeline of the five U.N. space law treaties, noting that the last one went into effect in 1984).

was still ongoing in territory just north of the United States—tensions were undoubtedly high and emotionally charged. In the mid-seventies when space technology still begged much to be explained and uncovered, it might have made more contextual sense to leave the country at fault completely liable for any damages resulting from a satellite crash, especially when the country in question was held in contempt with a portion of the rest of the world.<sup>70</sup>

The world is no longer stuck in the seventies—in the last forty years, technology has developed rapidly and has made space travel more accessible and more importantly, much safer. Unfortunately, the international attitude toward space development has not been as quick in its progression. The last of the five treaties dedicated solely to space law at the U.N. Convention is outdated by more than thirty years, and the convention has not made any modifications on its stance on liability.<sup>71</sup> The Cold War ended more than two decades ago, and maritime law has continued to move full steam ahead with ever-increasing amounts for ship owners seeking to limit their own liability.<sup>72</sup> Technology has not only advanced space travel and exploration that has slightly leveled the playing field between sea travel and space travel, but it has also made us travel smarter more safely.<sup>73</sup> There has not been another nuclear space incident even close to the gravity of *Cosmos 954* since the 1970s, largely due to improved technology and safety measures. Safety measures have grown steadily alongside technology, resulting in fewer devastating accidents—how we deal with the cleanup of assessing liability should follow the same path rather than remaining frozen in time.<sup>74</sup>

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70. See generally *Cold War History*, HISTORY, <http://www.history.com/topics/cold-war/cold-war-history> (last updated Aug. 28, 2018) (providing an overview of the Cold War timeline, as well as a description of the terse relationships between the U.S.S.R. and some of the North American countries, most notably the United States).

71. See Krause, *supra* note 19 (noting that the most recent treaty was opened for signatures in 1979 and entered into force in 1984).

72. See *Increased Limits of Liability Enter into Force in 2015*, *supra* note 56 (describing the numerous and constant changes to Maritime liability laws).

73. See generally Will Coldwell, *The Future of Travel: What Will Holidays Look Like in 2024?*, THE GUARDIAN (Sept. 29, 2014, 08:25 AM), <https://www.theguardian.com/travel/2014/sep/29/predicting-future-of-travel-holidays> (providing a brief overview of just how feasible space travel will likely be for the common population provided technology advances to where predicted); Mike Wall, *What the Next 50 Years Hold for Human Spaceflight*, SPACE (Apr. 12, 2011, 07:00 AM), <https://www.space.com/11364-human-space-exploration-future-50-years-spaceflight.html> (discussing recent developments in safety in space, as well as providing a view of how private space travel would work).

74. See generally *Making Outer Space a Safer Place: Raytheon Innovations Promote Safety in NASA and Military Space Operations*, RAYTHEON, [https://www.raytheon.com/news/feature/rtn\\_space\\_safety.html?WT.mc\\_id=twitter\\_socialmedia\\_N/A&utm\\_source](https://www.raytheon.com/news/feature/rtn_space_safety.html?WT.mc_id=twitter_socialmedia_N/A&utm_source)

## LIMITING LIABILITY OF OUTER SPACE TRAVEL INCIDENTS

As discussed for the majority of this paper, limitation of liability has been a long-standing principle of maritime law, international and local alike, for longer than space law has been in existence. One of the chief reasons that this principle has been enforced for so long and in so many places individually (and on a more uniform scope internationally) is to encourage ship owners to continue participating in shipping and travel activity.<sup>75</sup> This is specifically achieved through putting money back in a ship owner's pocket by allowing the individual to limit her liability for damages with hopes that the money saved will be used to venture out to sea in the shipping trade once again.<sup>76</sup> While space travel has never been more advanced than it is now, unfortunately, the price tag attached to such advanced exploration abilities is skyrocketing almost as quickly as the technology behind space travel.<sup>77</sup>

One pragmatic and efficient way to combat the issue of cost would be to borrow a leaf from the book of maritime law and amend the stringent, single-party liability constraints put in place by the 1972 Liability Convention.<sup>78</sup> Cost distribution for research and exploration missions is already looking bleak under the current administration's plans to make drastic cuts to NASA funding.<sup>79</sup> These cuts to NASA will not just affect the American people—NASA is one of the top, prestigious, government-funded space exploration groups in the world and provides much-needed research to advance scientific understandings, which are then absorbed and implemented by communities around the world.<sup>80</sup> Now more than ever, there is much on

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=twitter&utm\_medium=organic&utm\_campaign=N/A&linkId=36226068 (last updated Jan. 26, 2018) (discussing recent innovations and protections utilized by NASA in promoting safer space exploration and preparation practices).

75. *Principles of Liability Limitation*, AUSTRALIAN GOVERNMENT DEPARTMENT OF INFRASTRUCTURE, REGIONAL DEVELOPMENT AND CITIES, <https://infrastructure.gov.au/maritime/business/liability/limitation.aspx> (last updated Feb. 12, 2015).

76. *See id.*

77. *See generally* Michio Kaku, *The Cost of Space Exploration*, FORBES (Jul. 16, 2009, 05:00 PM), <https://www.forbes.com/2009/07/16/apollo-moon-landing-anniversary-opinions-contributors-cost-money.html#384a71801d04> (providing a brief insight behind the costs of space exploration in the 21st century).

78. *See* Convention on International Liability for damage Caused by Space Objects, *supra* note 2, at 25. (stating in Article II that the launching party is absolutely liable for damage caused by its space object).

79. *See* Kelly Kasulis, *Here's What We'll Lose with Trump's Proposed NASA Budget Cuts, and why One Expert is Calling It out*, BUSINESS INSIDER (May 24, 2017, 07:44 PM), <http://www.businessinsider.com/trump-nasa-budget-cuts-2017-5>.

80. *See generally* Ali Breland, *Trump's NASA Budget Cuts Earth, Climate Science Programs*, THE HILL (Mar. 16, 2017, 02:24 PM), <http://thehill.com/policy/technology/>

NASA's shoulders. The potential drastic cut in funding to one of the most important forerunners of modern space exploration will undoubtedly have more than just a local effect. This limited funding should not be unduly squandered on any potential international collision lawsuits as a result of the strict stipulations against limitation on liability.

NASA and other government-funded space programs party to the United Nations find themselves even more exposed to liability threats than shipowners and seafarers, who already have the extra protective layer of limited liability. This additional threat is expressed in Article III of the 1972 Liability Convention, which expands the plane for liability to beyond Earth's surface:

In the event of damage being caused elsewhere than on the surface of the earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible.<sup>81</sup>

This article remains unaltered. Not only are space traveling states fully liable for any damages that occur once they re-enter Earth's atmosphere, but they remain fully liable as well for any incident, whether to a person or property of another state, that occurs in outer space.<sup>82</sup> With the price of space exploration at an all-time high, it seems counterintuitive to be worrying over potential lawsuits costs for which a launching country would be fully liable rather than apportioning funds to research, greater missions, and increased safety practices.<sup>83</sup>

Space travel has never been more important than it is in the modern age. With funding going in the opposite direction, it is reckless

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324323-trump-nasa-budget-cuts-earth-climate-science-programs (shedding some light on NASA's unique position at the forefront of the global space exploration scale and what the effects of these budget cuts might have).

81. See Convention on International Liability for Damage Caused by Space Objects, *supra* note 2, at 25.

82. *Id.*

83. See generally Shannon Stirone, *The Real Cost of NASA Missions*, POPULAR SCIENCE (Nov. 4, 2015), <https://www.popsoci.com/real-cost-nasa-missions> (providing an overview of current space research and exploration expenditures); John Wenz, *What a \$19 Billion Budget Will Buy NASA*, POPULAR MECHANICS (Feb. 9, 2016), <http://www.popularmechanics.com/space/news/a19368/what-18-billion-will-get-a-space-agency-like-nasa/> (responding to NASA's request for funding last year, and what this funding would typically be used for and what programs funding is specifically apportioned to).



to maintain such stringent liability standards that might deplete essential funds. Continued space exploration by all nations able to participate is necessary to continue making advances in health, in communication and information technology, in environmental protections and advancements toward other possible habitable land, and even in increasing public safety measures.<sup>84</sup> While not every country with a space program is experiencing NASA's limitations, the ever-growing need for technological advancement and greater understanding of habitable life around us should continue to be nurtured by funding, not squandered by potential lawsuits that could exhaust a state's budget.<sup>85</sup>

As previously mentioned, an oft-cited reason for continuing to limit liability of craft owners is to continue encouraging participation in sea trade and sea travel.<sup>86</sup> For the first time, the Earth's citizens are living in a period in which space travel has a promising reality of being expanded to the masses.<sup>87</sup> While it is clear that the five U.N. treaties on space law did not give much thought at the time to the possibility of commercial or even private space exploration, if it decides to follow in the footsteps of maritime law, the five treaties' stipulations will likely be applied to commercial and private craft owners as well. This means that not only NASA and other space programs from around the world will be on the hook for full damages in the light of an accident but that commercial and private space explorers who do not have the same fifty-plus years of exploration experience will also be subject to the same harsh penalties. An incident on the same international devastation scale as Cosmos 954 has not occurred since the 1970s, a testament to the growth and experience of space programs worldwide.<sup>88</sup> It would be

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84. See Zaina Adamu, *Exploring Space: Why's it so Important?*, CNN (Oct. 20, 2012, 12:01 AM), <http://lightyears.blogs.cnn.com/2012/10/20/exploring-space-whys-it-so-important/>.

85. See generally *The 10 Countries Most Active in Space*, AEROSPACE TECHNOLOGY (Dec. 21, 2015), <http://www.aerospace-technology.com/features/featurethe-10-countries-most-active-in-space-4744018/> (providing an overview of the top ten countries most involved in space exploration and research, and what each country specifically spends their funding and time on in the space realm); Jeff Foust, *NASA Emphasizes Importance of Earth Science Given Concerns About Budget Cuts*, SPACE NEWS (Nov. 11, 2016), <http://spacenews.com/nasa-emphasizes-importance-of-earth-science-given-concerns-about-budget-cuts/> (defending proposed budget cuts in the face of the growing need for increased funding for earth science studies).

86. See *Principles of Liability Limitation*, *supra* note 75.

87. See Suraj Radhakrishnan, *Vacation on ISS? Russia to Offer Space Station Tours for \$40 Million*, INTERNATIONAL BUSINESS TIMES (Dec. 22, 2017, 05:22 AM), <http://www.ibtimes.com/vacation-iss-russia-offer-space-station-tours-40-million-2631952>.

88. See generally Michael Listner, *Revisiting the Liability Convention: Reflections on ROSAT, Orbital Space Debris, and the Future of Space Law*, THE SPACE REVIEW (Oct. 17,

an extremely unlikely event, however, for commercial and private space explorers alike to not experience at least one Cosmos-sized bump in the road during the early stages in their own space exploration history. These early forays into space should not be punished so harshly as proposed by the Liability Convention.

As noted, there are several glaring issues with the Liability Convention's stipulations when looking to both how liability is treated in other areas of travel and when considering budgeting issues on a global scale.<sup>89</sup> This issue becomes even more concerning when considering the inevitable possibility of space travel and exploration expanded to the masses both commercially and privately.<sup>90</sup> At this rate, commercial and private space travel may be shorter-lived than need be due to the current status of the Liability Convention. Even with the proposed budget cuts, it is highly unlikely that even a minority of would-be novice space explorers and luxury travel countries could afford the same budget as NASA, let alone the impending doom of costs for full liability damages if anything were to go wrong due to inexperience.<sup>91</sup>

Commercial and private space travel cannot be the future if we cannot first lighten the constraints on space programs. The Liability Convention cannot continue living in the 1970s in the infancy of space exploration when the technology exists to solve major health crises, to promote new communication technology, and to expand the horizon of new possibilities of life and expansion on other planets.<sup>92</sup> Even with the new advances in technology allowing for heightened safety measures, no one was prepared for the devastation that Cosmos 954 left in its wake—anything could happen at any time, even with the best of intentions and best planning.<sup>93</sup> Even with the proposed budget cuts, the United States is still the home of the most highly-funded and best-celebrated space

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2011), <http://www.thespacereview.com/article/1948/1> (providing an in-depth overview of the effects of determining whether or not something falls under the scope of the Convention in a post-Cosmos world, as well as assessing other minor satellite re-entry incidents).

89. See generally Stirone, *supra* note 83; Wenz, *supra* note 83.

90. See Radhakrishnan, *supra* note 87.

91. See generally Rachel Becker, *How Much are SpaceX Tourists Actually Paying to fly Around the Moon?*, THE VERGE (Feb. 28, 2017, 12:19 PM), <https://www.theverge.com/2017/2/28/14763632/spacex-private-moon-flight-price-cost-estimate-nasa-space-adventures> (outlining the costs for an individual flier on a commercial flight but remains tight-lipped about just how much this trip would cost SpaceX – for context, Elon Musk has a net worth of 20.1 billion dollars, about the same as NASA's budget, but one must consider that his entire net worth is not being poured into SpaceX).

92. See Adamu, *supra* note 84.

93. See generally Cohen, *supra* note 59 (describing the crash of Cosmos 954 and the damage that followed).

program in the world.<sup>94</sup> The research conducted by NASA via space exploration has global effect in its reach. The fact that the budget is set to shrink drastically in a time when space exploration is needed more than ever is concerning.<sup>95</sup> Even more concerning is the fact that under the ever-unchanging stipulations of the Liability Convention, all of this budget could likely be up for the taking if an accident were to occur.<sup>96</sup> Change has to start at the foundation, at the heart of the Liability Convention, and government-sponsored space programs nationwide must be adapted if we are to even consider the possibility of normalized commercial and private space travel in the next several decades.

### CONCLUSION

It is difficult to fathom that space exploration is well on its way to reaching the semblance of mainstream status that travel by sea has held for generations. Even more difficult to comprehend is the reality that a large percentage of many space programs' budgets around the world is used to advance the possibility of finding habitability in other locations, of building property at such locations, or even of searching the universe for other life.<sup>97</sup> While at one point in time, maybe even in the 1970s, the aforementioned possibilities would have seemed incredibly futuristic, we cannot pretend that this is the case anymore. The so-called "future" of space exploration is the now—it is the very present—and it is nonsensical to continue relying on stipulations from outdated international treaties that could not have predicted how far we might come in fifty years. Of a similar vein, these treaties (the Liability Convention in particular) could not have predicted how budget cuts might work against the importance of continuing these explorations and how the inability to limit one's liability further hinders the good cause of space exploration. Like sea travel, space travel is no longer a new,

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94. See John Misachi, *Countries Who Spend the Most on Space Exploration*, WORLD ATLAS, <https://www.worldatlas.com/articles/which-countries-spend-the-most-on-space-exploration.html> (last updated Apr. 25, 2017).

95. See Breland, *supra* note 80.

96. See generally Convention on International Liability for Damage Caused by Space Objects, *supra* note 2 (noting that the lack of updates or amendments to the 1972 Liability Convention).

97. See generally Jonathan O'Callaghan, *We're Going to Europa! US Committee Assigns \$18.5 Billion to Fund NASA's Search for Alien Life and a Mission to Jupiter's Moon*, DAILY MAIL (May 20, 2015, 08:23 AM), <http://www.dailymail.co.uk/sciencetech/article-3089338/We-going-Europa-committee-assigns-18-5-billion-fund-Nasa-s-search-alien-life-mission-Jupiter-s-moon.html> (describing the reaches of NASA's budget plan and search for alien life, briefly touching on what this might mean globally depending on findings).

inconceivable entity for which travel or expedition consequences cannot be predicted. To get the most out of trim space exploration budgets across the globe and to continue widening the playing field for those in commercial and private roles that wish to contribute to the expedition cause, the United Nations should convene to amend the stipulations of the Liability Convention and borrow from international maritime law's limitation of liability standard.<sup>98</sup> The future is today, and today's future will only continue to shine brightly if we opt to reform the ways of the past—this time through limiting the liability of states, commercial, and private space explorers alike in the face of damages.

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98. *See generally* Martinez Gutierrez, *supra* note 8.

