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# Astro-Not? How Current Space Treaties Could Fall Short of Protecting Future Space Tourists

Megan McCauley

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# Astro-Not? How Current Space Treaties Could Fall Short of Protecting Future Space Tourists

Megan McCauley\*

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*“You don’t have to be Arthur Dent and wait for our blue rock to go bust before you hitch a ride on a rocket into space. . . . [A]ll you need to go into space is a little bit of money, coupled with patience, and trust in Silicon Valley to pull through with its grand plans for space tourism. Checked all those boxes? Strap on your seat belt and start dreaming about zero-G.”<sup>1</sup>*

I. INTRODUCTION

The year is 2025, and a spacecraft full of starry-eyed tourists takes off from the Kennedy Space Center in Florida.<sup>2</sup> The spacecraft is operated by the United States company SpaceX and carries one pilot, two crewmembers, and two civilian passengers.<sup>3</sup> Its mission is to make an 800,000-mile round-trip journey

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1. Arun Venkatraman, *GQ’s Guide to Becoming a Space Tourist*, GQ INDIA (Aug. 8, 2017), <https://www.gqindia.com/content/gqs-guide-to-becoming-a-space-tourist/> (on file with *The University of the Pacific Law Review*).

2. See generally Mika McKinnon, *Will We Have Space Tourism in Our Lifetime?*, THE PORTALIST (Dec. 9, 2016), [https://theportalist.com/will-we-have-space-tourism-in-our-lifetime](https://theportalist.com/will-we-have-space-tourism-in-our-lifetime/) (on file with *The University of the Pacific Law Review*) (discussing the timeliness of the space tourism industry, along with its biggest obstacles).

3. See generally Angela Chen, *SpaceX Plans to Send Two People Around the Moon*, THE VERGE (Feb. 27, 2015), <https://www.theverge.com/2017/2/27/14754404/spacex-moon-mission-2018-clon-musk-announces-private-citizen-passengers> (on file with *The University of the Pacific Law Review*) (explaining that SpaceX has already sold advance tickets for a flight around the moon to two civilian passengers).

around the Moon.<sup>4</sup> One day into their five-day trek, the ship loses all power, and its communications systems become irreparably disabled.<sup>5</sup> Life support systems will only sustain those on board for two days.<sup>6</sup> The next day, a Chinese spacecraft approaches the paralyzed ship.<sup>7</sup>

China is a party to the Agreement on the Rescue of Astronauts, and the Return of Astronauts and the Return of Objects Launched into Outer Space (“Rescue Agreement”), which obligates signatories to both rescue and return distressed “personnel of spacecraft” they discover in outer space.<sup>8</sup> China is also a party to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (“Outer Space Treaty”), which imposes similar rescue and return obligations for distressed “astronauts” found in outer space.<sup>9</sup>

The Chinese vessel does not have enough oxygen to accommodate an additional five individuals and is forced to make a difficult choice.<sup>10</sup> After deciding the civilian tourists were neither “personnel” nor “astronauts,” the Chinese crew claims that the Rescue Agreement and the Outer Space Treaty do not impose any obligation to rescue the tourists in the situation at hand.<sup>11</sup> Based on this understanding of their legal obligations, the crew of the Chinese

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4. Tariq Malik, *As SpaceX Unveils Space Tourist Moon Flight, NASA Reacts*, SPACE (Feb. 28, 2017), <https://www.space.com/35850-spacex-private-moon-flight-nasa-reaction.html> (on file with *The University of the Pacific Law Review*).

5. *See Marooned (1969): Plot*, IMDB (last visited Mar. 12, 2018), [https://www.imdb.com/title/tt0064639/plotsummary?ref\\_=tt\\_stry\\_pl#synopsis](https://www.imdb.com/title/tt0064639/plotsummary?ref_=tt_stry_pl#synopsis) (on file with *The University of the Pacific Law Review*) (summarizing the plot of the 1969 film “Marooned,” which depicted a similar situation where crew of a spacecraft experience engine failure, with only enough oxygen to last for two days).

6. *See id.* (summarizing the plot of the 1969 film “Marooned,” which depicted a similar situation where crew of a spacecraft experience engine failure, with only enough oxygen to last for two days).

7. *See id.* (depicting the situation of a Russian spacecraft attempting to rescue those on board the stranded ship).

8. UNITED NATIONS COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE, STATUS OF INTERNATIONAL AGREEMENTS RELATING TO ACTIVITIES IN OUTER SPACE AS AT 1 JANUARY 2018, 5, *available at* [http://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105\\_C2\\_2018\\_CRP03E.pdf](http://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2018_CRP03E.pdf) (last visited Jan. 24, 2019) (on file with *The University of the Pacific Law Review*) [hereinafter COPUOS, STATUS OF INTERNATIONAL AGREEMENTS]; Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, art. 2, Dec. 3, 1968, 19 U.S.T. 7570, T.I.A.S. No. 6599 [hereinafter Rescue Agreement].

9. COPUOS, STATUS OF INTERNATIONAL AGREEMENTS, *supra* note 8, at 5; Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, art. 5, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

10. *See* Chen, *supra* note 3 (explaining that only two tourists would be able to join crew on a SpaceX flight around the Moon, suggesting there will be minimal space in a tourist spacecraft).

11. *See* Yanal Abul Failat, *Space Tourism: A Synopsis on its Legal Challenges*, 1 I.L.J. 120, 122 (2012) (explaining the ambiguity and the risk of the existing legal framework governing the duty to rescue in outer space); *see also* Stephan Hobe, *Legal Aspects of Space Tourism*, 86 NEB. L. REV. 439, 455 (2007) (noting the impact of this issue on passenger rights in emergency situations); *see also* Steven Freeland, *Up, Up and . . . Back: The Emergence of Space Tourism and Its Impact on the International Law of Outer Space*, 6 CHI. J. INT’L L. 1, 10 (2005) (explaining the consequences of whether space tourists are encompassed within the existing treaties).

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spacecraft rescues the stranded crewmembers and pilot and returns to Earth.<sup>12</sup> They leave the tourists behind with less than one day's supply of oxygen and no chance of survival.<sup>13</sup>

This hypothetical situation illuminates a serious problem facing the space tourism industry: an antiquated and ambiguous legal framework that lags behind modern reality.<sup>14</sup> Before the average person can readily access space travel, the international community or the States themselves must clarify States' rescue and return obligations to provide certainty for people undertaking these risky endeavors.<sup>15</sup>

As private companies like SpaceX continue to expand their ability to offer civilian spaceflights, widespread space tourism will become a reality in the near future.<sup>16</sup> In recent years, the idea of commercial space tourism has evolved from being mere fantasy to an actual possibility.<sup>17</sup> Some commercial spaceflight companies have already sold advance tickets to individuals who hope to get their moment in the stars.<sup>18</sup> In marketing campaigns, these companies often refer to their customers as "future astronauts."<sup>19</sup> Legal issues arise, however, because space tourists may not fit within the meaning of "astronauts" or other related terms as used in international law.<sup>20</sup>

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12. See Michael Listner, *The Interaction of the Definition of Astronaut and International Law*, SPACE THOUGHTS (Nov. 24, 2015), <https://spacethoughtsblog.wordpress.com/2015/11/24/the-interaction-of-the-definition-of-astronaut-and-international-law/> (on file with *The University of the Pacific Law Review*) (explaining the risk that space tourists may be left behind if the ambiguity in the treaty language is interpreted strictly); Hobe, *supra* note 11, at 455.

13. See Listner, *supra* note 12 (explaining the risk that space tourists may be left behind if the ambiguity in the treaty language is interpreted strictly); see Hobe, *supra* note 11, at 455 (noting that the primary implication of this issue deals with "obligations in case of emergency").

14. 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](http://www.abajournal.com/magazine/article/outer_space_treaty) (on file with *The University of the Pacific Law Review*).

15. Brian Beck, *The Next, Small Step for Mankind: Fixing the Inadequacies of the International Space Law Treaty Regime to Accommodate the Modern Space Flight Industry*, 19 ALB. L.J. SCI. & TECHN. 1, 37 (2009). In international law, "statehood" requires "(a) a permanent population; (b) a defined territory; (c) government; and (d) capacity to enter into relations with other States." *State*, MAX PLANCK ENCYCLOPEDIA OF PUBLIC INTERNATIONAL LAW (Jan. 2011).

16. Andrew Maynard, *Elon Musk's Sexy Spacesuit is One Giant Leap for Space Tourism*, FORTUNE INSIDER (Aug. 24, 2017), <http://fortune.com/2017/08/24/spacex-spacesuit-elon-musk-design-space/> (on file with *The University of the Pacific Law Review*).

17. Steven Freeland, *Fly Me to the Moon: How Will International Law Cope with Commercial Space Tourism?*, 11 MELB. J. INT'L L. 90, 92 (2010).

18. Adam Mann, *So You Want to Be a Space Tourist? Here are Your Options*, NBC NEWS (July 21, 2017), <https://www.nbcnews.com/mach/science/so-you-want-be-space-tourist-here-are-your-options-ncna784166> (on file with *The University of the Pacific Law Review*); Freeland, *supra* note 17, at 92.

19. Listner, *supra* note 12; see *Learn*, VIRGIN GALACTIC, <https://www.virgingalactic.com/learn/> (last visited Feb. 8, 2018) (on file with *The University of the Pacific Law Review*) ("As our newly-official astronauts step out of the spaceship, they will be part of the most exclusive group of adventurers in the world.")

20. Listner, *supra* note 12; Hobe, *supra* note 11, at 455.

Resolving this ambiguity is critical because the existing body of international treaties uses peoples' status as "astronauts" or "personnel" to define the legal obligations owed to them.<sup>21</sup> If space tourists do not qualify as either "astronauts" or "personnel," rescuers would be obligated to save only the crew and pilots, but not the passengers, as in the hypothetical above.<sup>22</sup> This exposes space tourists to unique safety risks when embarking on what is already an inherently dangerous voyage.<sup>23</sup> These risks are magnified by the fact that space tourists will only receive rudimentary training, and will thus be less prepared to deal with emergencies on spaceflights than the government-sponsored astronauts who have gone to space before them.<sup>24</sup> To safeguard the lives of tomorrow's space tourists and add certainty to an already dangerous activity, it is critical to develop a well-defined and predictable legal framework.<sup>25</sup>

While the existing body of international space law has already established a guiding framework for the duties owed to those who venture into space, it also serves as the groundwork for developing a more comprehensive and workable system for regulating future space activities.<sup>26</sup> The task of ensuring the safety of all persons on board a spaceflight requires collaboration between both space-faring and non-space-faring nations across the planet.<sup>27</sup>

To ensure space tourists are not left behind on rescue missions, the law should include a clear definition of space tourists along with language providing that the terms "astronauts" and "personnel," as used in the Outer Space Treaty and the Rescue Agreement, apply to all persons on board a spacecraft.<sup>28</sup> This Comment proposes three mechanisms to implement these substantive changes.<sup>29</sup> First, to address the issue in the short-term, the UN General Assembly should adopt a non-binding resolution establishing a model policy for binding national legislation that expands the duty to rescue to cover all spaceflight passengers.<sup>30</sup> Second, in the medium-term, States Parties to the Outer Space Treaty and Rescue Agreement should agree the terms "astronauts" and "personnel" include space

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21. Failat, *supra* note 11, at 122.

22. Freeland, *supra* note 11, at 10.

23. See Hobe, *supra* note 11, at 455 (explaining that "obligations in case of emergency" are the primary issues surrounding the status of space tourists as either "astronauts" or "personnel").

24. FRANCIS LYALL, *SPACE LAW: A TREATISE* 132 (Paul Larson, ed., 2009).

25. Zhao Yun, *A Legal Regime for Space Tourism: Creating Legal Certainty in Outer Space*, 74 J. AIR L. & COM. 959, 961 (2009).

26. Freeland, *supra* note 17, at 93 ("[T]here is still much to be done . . . in terms of putting into place an appropriate . . . body of law and regulation to adequately deal with the challenges posed by . . . commercial space tourism activities.").

27. See G.A. Res. 51/122, Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States (Dec. 13, 1996) (recognizing the need for involvement of both space-faring and non-space-faring nations).

28. *Infra* Part V.A.

29. See *infra* Part V (laying out a proposed solution to this issue).

30. *Infra* Parts V.B.1–2.

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tourists.<sup>31</sup> Third, in the long-term, a new treaty dedicated solely to private space travel will be necessary to address the problems discussed in this Comment, as well as the many other emerging legal issues created by this rapidly expanding industry.<sup>32</sup>

Part II of this Comment explains the recent developments that have thrust private spaceflight into the limelight and outlines the reality of space tourism in the future.<sup>33</sup> Part III describes the existing Cold War-era body of space treaties and highlights the extent to which, if at all, these treaties address the status of those involved in spaceflight.<sup>34</sup> Part IV uses the interpretive tools set forth in the Vienna Convention on the Law of Treaties (“Vienna Convention”) to analyze whether the language of the existing space law treaties extends to space tourists.<sup>35</sup> Part V proposes a specific set of substantive provisions and mechanisms for eliminating the existing ambiguity.<sup>36</sup>

## II. EMERGENCE OF THE COMMERCIAL SPACE TOURISM INDUSTRY

Space tourism became a reality in 2001 when Russia began offering “space-hungry multi-millionaires” the opportunity to cash in for a ticket to space.<sup>37</sup> Since then, many private companies have competed to find their place in the lucrative business of commercial spaceflight.<sup>38</sup> As these developments “hurtl[e] ahead with dizzying speed . . . the body of space law upon which space tourism must be based remains clunky.”<sup>39</sup> This disconnect reveals a potentially dangerous loophole for space tourists but also serves as a unique opportunity for countries to work together in crafting a workable solution to this modern issue.<sup>40</sup> Section A clarifies the term “space tourism,”<sup>41</sup> and section B traces the emergence of the space tourism market.<sup>42</sup>

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31. *Infra* Part V.C.

32. *Infra* Part V.D.

33. *Infra* Part II.

34. *Infra* Part III.

35. *Infra* Part IV.

36. *Infra* Part V.

37. Catherine E. Parsons, *Space Tourism: Regulating Passage to the Happiest Place on Earth*, 9 CHAP. L. REV. 493, 494, 499 (2006).

38. Julie C. Easter, *Spring Break 2023 – Sea of Tranquility: The Effect of Space Tourism on Outer Space Law and World Policy in the New Millennium*, 26 SUFFOLK TRANSNAT’L L. REV. 349, 366 (2003).

39. Gbenga Oduntan, *Is Space Tourism Traveling Faster Than Space Law?*, THE CONVERSATION (June 23, 2015 1:18 A.M.), <https://theconversation.com/is-space-tourism-travelling-faster-than-space-law-43586> (on file with *The University of the Pacific Law Review*).

40. Freeland, *supra* note 17, at 93.

41. *Infra* Part II.A.

42. *Infra* Part II.B.

A. What is Space Tourism?

Since the 1960s, over 550 individuals have traveled to outer space.<sup>43</sup> Moving forward, it is important to understand how modern space tourists differ from those who traveled to outer space before them.<sup>44</sup> For many, space tourism evokes images of hordes of eager people crammed inside an airplane-like shuttle, headed toward humanity's new frontier.<sup>45</sup> For the foreseeable future, however, space tourism will be much different.<sup>46</sup> Shuttles will be able to accommodate few people, generally including between four and six seats for tourists.<sup>47</sup> Spaceflights will "resemble [a] ride on Disney's Space Mountain [sic]," rather than crowded airplanes with room for hundreds.<sup>48</sup> This may change in the future, but the short-term reality of space tourism will be highly selective and only for the lucky few who can afford the hefty ticket price.<sup>49</sup>

What distinguishes this new group of space tourists from their predecessors is the fundamentally private character of their space activities.<sup>50</sup> Historically, national governments paid for and operated spaceflights.<sup>51</sup> The state often selected astronauts for participation in manned spaceflight programs.<sup>52</sup> Space tourism, in its present and future state, diverges from this tradition and signals the privatization of spaceflight and the birth of a new space race across the globe.<sup>53</sup>

B. The Privatization of Spaceflight: The New Space Race

Commercial space tourism is "no longer the stuff of comic books or science fiction."<sup>54</sup> To date, seven space tourists have already had their moment in the

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43. Tanja Masson-Zwaan & Steven Freeland, *Between Heaven and Earth: The Legal Challenges of Human Space Travel*, 66 ACTA ASTRONAUTICA 1597, 1599 (2010); Heather Brown, *Good Question: How Many People Have Gone to Space?*, CBS (Mar. 2, 2016), <http://minnesota.cbslocal.com/2016/03/02/good-question-astronauts/> (on file with *The University of the Pacific Law Review*).

44. Professor Frans G. von der Dunk, *Space Tourism, Private Spaceflight and the Law: Key Aspects*, 16 NEB. LAW. 21, 22 (2013).

45. Masson-Zwaan & Freeland, *supra* note 43, at 1599.

46. *Id.*

47. *Id.*

48. *Id.*

49. *Id.*

50. Von der Dunk, *supra* note 44, at 23.

51. *Id.* at 21.

52. See *1965 Dictionary of Technical Terms for Aerospace Use*, NASA, <https://er.jsc.nasa.gov/seh/a.html> (last visited Feb. 8, 2018) (on file with *The University of the Pacific Law Review*) [hereinafter *1965 Dictionary*] (defining "astronaut" as someone who was "selected to participate in . . . [any] United States program for manned spaceflight").

53. Monica Grady, *Private Companies are Launching a New Space Race – Here's What to Expect*, PHYS.ORG (Oct. 3, 2017), <https://phys.org/news/2017-10-private-companies-space.html> (on file with *The University of the Pacific Law Review*).

54. Oduntan, *supra* note 39.



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stars.<sup>55</sup> Space tourism made its international debut in April 2001, when U.S. national Dennis Tito paid roughly \$20 million for a six-day vacation aboard Russia's sector of the International Space Station ("ISS").<sup>56</sup> Tito, "a 60-year old California millionaire, was an investment fund manager and former NASA rocket scientist."<sup>57</sup> Russia used the money it received from Tito to fund its space program and help tackle its national debt problem.<sup>58</sup> Just one year later, the world's second space tourist, Mark Shuttleworth, also traveled to the ISS.<sup>59</sup>

Virgin Galactic, a commercial spaceflight company, has already sold over 700 tickets—each priced at \$250,000.<sup>60</sup> This totals a staggering \$175 million in ticket sales for just one company offering these flights.<sup>61</sup> Virgin Galactic's SpaceShipTwo, which holds six passengers and two pilots, will travel 100 kilometers, or roughly 62 miles, above Earth.<sup>62</sup> It will travel past the Kármán Line, which has historically represented the unofficial boundary between Earth's atmosphere and outer space.<sup>63</sup> For a few moments, passengers will experience

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55. These seven space tourists include: Dennis Tito (2001), Mark Shuttleworth (2002), Greg Olsen (2005), Anousheh Ansari (2006), Charles Simonyi (2007, 2009), Richard Garriott (2008), and Guy Laliberté (2009). Mike Wall, *First Space Tourist: How a U.S. Millionaire Bought a Ticket to Orbit*, SPACE (Apr. 27, 2011), <https://www.space.com/11492-space-tourism-pioneer-dennis-tito.html> (on file with *The University of the Pacific Law Review*); Cliff Ransom, *Internet Tycoon, 28, Heads Aloft as "Space Tourist,"* NAT'L GEOGRAPHIC NEWS (Apr. 16, 2002), [https://news.nationalgeographic.com/news/2002/04/0416\\_020416\\_ADVspacetourist.html](https://news.nationalgeographic.com/news/2002/04/0416_020416_ADVspacetourist.html) (on file with *The University of the Pacific Law Review*); Michael Schirber, *Greg Olsen Back on Track to Be Third Space Tourist*, SPACE (July 28, 2005), <https://www.space.com/1361-greg-olsen-track-space-tourist.html> (on file with *The University of the Pacific Law Review*); Sara Goudarzi, *Interview with Anousheh Ansari, the First Female Space Tourist*, SPACE (Sept. 15, 2006), <https://www.space.com/2889-interview-anousheh-ansari-female-space-tourist.html> (on file with *The University of the Pacific Law Review*); Tariq Malik, *The Fifth Space Tourist: American Entrepreneur Charles Simonyi Prepares for Liftoff*, SPACE (Apr. 5, 2007), <https://www.space.com/3642-space-tourist-american-entrepreneur-charles-simonyi-prepares-liftoff.html> (on file with *The University of the Pacific Law Review*); Richard Garriott de Cayeux, *NASA Said No to My Astronaut Dream, So I Found Another Way*, NBC NEWS (July 18, 2017), <https://www.nbcnews.com/mach/science/nasa-said-no-my-astronaut-dream-so-i-found-another-ncna776056> (on file with *The University of the Pacific Law Review*); Clara Moskowitz, *Circus Billionaire Says Space Trip Worth Every Penny*, SPACE (Oct. 6, 2009), <https://www.space.com/7375-circus-billionaire-space-trip-worth-penny.html> (on file with *The University of the Pacific Law Review*).

56. Freeland, *supra* note 17, at 96.

57. Parsons, *supra* note 37, at 499.

58. *Id.*

59. Freeland, *supra* note 17, at 97.

60. Ryan O'Hare, *Virgin Galactic Re-Enters the Space Race: Richard Branson Set to Launch New Plane to Blast Tourists into Orbit*, DAILY MAIL (Feb. 18, 2016), <http://www.dailymail.co.uk/sciencetech/article-3453788/Bransons-Virgin-Galactic-moves-return-space-race.html> (on file with *The University of the Pacific Law Review*).

61. *Id.*

62. Learn, *supra* note 19; Patrick Caughill, *Virgin Galactic CEO: We'll Be Ready to Send Tourists Into Space in 2018*, FUTURISM (May 9, 2017), <https://futurism.com/virgin-galactic-ceo-well-be-ready-to-send-tourists-into-space-in-2018/> (on file with *The University of the Pacific Law Review*).

63. Skye Gould & Sean Kane, *Here's Where Outer Space Actually Begins*, BUS. INSIDER (July 8, 2016), <http://www.thisinsider.com/where-does-space-begin-2016-7> (on file with *The University of the Pacific Law Review*) (explaining that the Kármán line is at 62 miles, or roughly 100 kilometers, above Earth).

weightlessness in microgravity.<sup>64</sup> As one reporter noted, “Virgin Galactic is building the world’s most expensive roller coaster, the aerospace version of Beluga caviar.”<sup>65</sup> Because the first passengers who board these commercial spaceflights should be fully aware of the legal situation they may face once on board, there is an urgent need to update the corpus of space law.<sup>66</sup>

As of April 2017, “at least 19 countries have, are developing[,] or are planning to host spaceports for orbital and suborbital launches.”<sup>67</sup> Companies in “Japan, Russia, and the United States are already preparing to implement specific strategies to place their national economies in space travel’s forefront.”<sup>68</sup> As private companies continue to reach for the stars, outer space is quickly becoming big business and a new space race is underway across the globe.<sup>69</sup> This booming new industry is challenged by the fact that it is internationally governed by a relatively small body of law.<sup>70</sup>

### III. THE EXISTING BODY OF INTERNATIONAL SPACE LAW AND ITS LIMITATIONS

The existing body of space law treaties provides for a duty to rescue “astronauts” and “personnel of spacecraft,” but does not define either term.<sup>71</sup> It is thus unclear whether these categories include space tourists.<sup>72</sup> If space tourists are neither “astronauts” nor “personnel,” those in a position to rescue such tourists in the case of emergency would not be obligated to do so.<sup>73</sup> Understanding these treaties is an essential component of crafting a viable and workable solution in the future.<sup>74</sup>

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64. Caughill, *supra* note 62; *What is Microgravity?* NASA (Mar. 30, 2010), <https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-microgravity-k4.html> (on file with *The University of the Pacific Law Review*) (“Microgravity is when things seem to be weightless.”); *Microgravity*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/microgravity> (last visited Apr. 5, 2018) (on file with *The University of the Pacific Law Review*) (“Microgravity” is “a condition in space in which only miniscule forces are experienced: virtual absence of gravity”).

65. Frederic J. Brown, *Space Tourism Isn’t Worth Dying For*, WIRE (Oct. 31, 2014), <https://www.wired.com/2014/10/virgin-galactic-boondoggle/> (on file with *The University of the Pacific Law Review*).

66. Beck, *supra* note 15, at 33.

67. Krause, *supra* note 14.

68. Easter, *supra* note 38, at 366.

69. Krause, *supra* note 14.

70. Matthew J. Kleiman, *Space Law 101: An Introduction to Space Law*, ABA J., [https://www.americanbar.org/groups/young\\_lawyers/publications/the\\_101\\_201\\_practice\\_series/space\\_law\\_101\\_an\\_introduction\\_to\\_space\\_law.html](https://www.americanbar.org/groups/young_lawyers/publications/the_101_201_practice_series/space_law_101_an_introduction_to_space_law.html) (last visited Feb. 8, 2018) (on file with *The University of the Pacific Law Review*); *see infra* Part III.

71. *See* Outer Space Treaty, *supra* note 9 (using the term “astronaut,” but neglecting to define it); *see also* Rescue Agreement, *supra* note 8 (referring to “personnel,” but neglecting to define the term).

72. Failat, *supra* note 11, at 122.

73. *Id.*

74. *See* I.H.PH. DIEDERIKS-VERSCHOOR, AN INTRODUCTION TO SPACE LAW 21 (1993) (exploring the

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Space law consists primarily of treaties, largely because of the “decisive role of the United Nations in creating space law” and its recognition that “international cooperation was absolutely essential if uncontrolled activities and chaotic developments were to be avoided.”<sup>75</sup> After the launch of Sputnik in 1957, the international community began to formulate a framework for space activities to ameliorate immediate concerns over arms control in outer space.<sup>76</sup> The UN’s cooperative approach to outer space first came to fruition in 1959, when the General Assembly formed the Committee for the Peaceful Uses of Outer Space (“COPUOS”).<sup>77</sup> This Committee “enables the U.N. to serve as the principal body for the development of outer space law and provides a forum for international scholars to create a legal framework for outer space activities.”<sup>78</sup>

Within a few years of its creation, the COPUOS authored five treaties that became the foundation of international space law.<sup>79</sup> Two of these treaties relate to the rescue and return of “personnel” and “astronauts.”<sup>80</sup> In developing the legal framework for space activities, the UN drew from previous conventions, such as the Antarctic Treaty and the Convention on the High Seas, and relied on widely established principles of international law.<sup>81</sup>

The COPUOS crafted each of these treaties in an era when space travel was still a novelty.<sup>82</sup> At the time, no one seriously “anticipated that humankind would engage in widespread commercial space tourism,” and thus civilian passengers fitting into those treaties was not a realistic concern.<sup>83</sup> When the term “astronaut” first appeared in space law, private manned spaceflight was still a prospect of the distant future.<sup>84</sup> Until very recently, nearly all “astronauts” were employed by

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corpus of international space law).

75. *Id.*

76. Beck, *supra* note 15, at 10.

77. DIEDERIKS-VERSCHOOR, *supra* note 74, at 21. The COPUOS was instructed to “maintain close contact with all governmental and non-governmental organizations dealing with related issues as well as to collect data on the activities of member States in the field of the exploration and use of outer space.” MANFRED LACHS, *THE LAW OF OUTER SPACE: AN EXPERIENCE IN CONTEMPORARY LAW-MAKING* 31 (1972).

78. Easter, *supra* note 38, at 354.

79. Beck, *supra* note 15, at 10–11. For the purposes of this Comment, only two of these treaties will be discussed since they directly apply to the issue at hand. The three omitted treaties include: Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 5, 1979, 1363 U.N.T.S. 3 (use and exploration of the moon); Convention on the International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 (launching space objects); and Convention on the Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15 (registration of space objects).

80. Outer Space Treaty, *supra* note 9, at art. v; Rescue Agreement, *supra* note 8.

81. Easter, *supra* note 38, at 358–59.

82. Freeland, *supra* note 17, at 95.

83. *Id.*; Failat, *supra* note 11, at 122.

84. LYALL, *supra* note 24, at 130.

governmental space agencies, rather than private companies.<sup>85</sup> This historical understanding may shed light on the drafters' intent and the appropriate interpretation of these treaties.<sup>86</sup> Section A discusses the Outer Space Treaty.<sup>87</sup> Section B explains the Rescue Agreement.<sup>88</sup>

*A. The Outer Space Treaty of 1967*

The parties negotiated the Outer Space Treaty during the height of the Cold War.<sup>89</sup> At that time, the space race was on everyone's minds and "[b]oth the US and the Soviet Union [were focused on] . . . prevent[ing] the expansion of the nuclear arms race into a completely new territory."<sup>90</sup> As of January 2018, there are 107 parties to the treaty.<sup>91</sup>

In a mere seventeen articles, the Outer Space Treaty establishes a set of rules governing activities in outer space, including the Moon and other celestial bodies.<sup>92</sup> For example, each State Party is responsible for its citizens' conduct in outer space.<sup>93</sup> Perhaps most relevant to this Comment, the Outer Space Treaty delineates rescue obligations for "astronauts" in distress.<sup>94</sup> Article V requires States Parties to "render . . . [astronauts] all possible assistance in the event of accident, distress, or emergency landing on the territory of another State Party or on the high seas."<sup>95</sup> This provision articulates that parties owe a duty of care to "astronauts."<sup>96</sup> Because the treaty does not define "astronaut," it remains unclear whether it is appropriate to interpret that term as encompassing space tourists.<sup>97</sup> Additionally, Article VIII of the Outer Space Treaty, which deals with jurisdiction and control over space objects, uses the term "personnel," instead of "astronaut."<sup>98</sup> These internal inconsistencies may be a product of the drafters'

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85. *Id.* at 131.

86. Failat, *supra* note 11, at 122–23.

87. *Infra* Part III.A.

88. *Infra* Part III.B.

89. Jason Krause, 5 *United Nations Treaties in Outer Space*, ABA J. (Apr. 2017), [http://www.abajournal.com/magazine/article/space\\_law](http://www.abajournal.com/magazine/article/space_law) (on file with *The University of the Pacific Law Review*); Outer Space Treaty, *supra* note 9.

90. Loren Grush, *How an International Treaty Signed 50 Years Ago Became the Backbone for Space Law*, THE VERGE (Jan. 27, 2017), <https://www.theverge.com/2017/1/27/14398492/outer-space-treaty-50-anniversary-exploration-guidelines> (on file with *The University of the Pacific Law Review*).

91. COPUOS, STATUS OF INTERNATIONAL AGREEMENTS, *supra* note 8, at 10.

92. Grush, *supra* note 90; *see* Outer Space Treaty, *supra* note 9.

93. Krause, *supra* note 14.

94. Outer Space Treaty, *supra* note 9, at art. v.

95. *Id.*

96. *Id.*

97. Steven A. Mirmina, *Astronauts Redefined: The Commercial Carriage of Humans to Space and the Changing Concepts of Astronauts under International and U.S. Law*, 10 FIU L. Rev. 669, 671 (2015).

98. Outer Space Treaty, *supra* note 9, at art. viii.

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oversight or a desire to apply a broad meaning to both of those terms.<sup>99</sup>

Article VI of the Outer Space Treaty vests international responsibility for national space activities in the States Parties, “whether such activities are carried on by governmental agencies or by non-governmental entities,” and requires them to assure that national activities conform to the treaty.<sup>100</sup> While it has yet to be decided, some scholars argue that this distinction between governmental and non-governmental entities shows that the drafters intentionally left the door open to future private spaceflight.<sup>101</sup>

While the Outer Space Treaty established a framework for space activities, it was not meant to address every facet of space law because its drafters expected that subsequent clarifying treaties would follow shortly thereafter.<sup>102</sup> For instance, to avoid overly precise interpretations, it did not define terms used throughout the treaty, nor did it establish specific guidelines for regulating private commercial actors in outer space.<sup>103</sup> Instead, the COPUOS designed the Outer Space Treaty to target general issues accompanying technological advancement in the context of the Cold War-era space race.<sup>104</sup> A majority of space law scholars, politicians, and lawmakers agree that the existing international framework for space law is a step behind the technological and commercial advances in this field.<sup>105</sup> To date, very little progress has been made.<sup>106</sup> This exposes a need for clarification of the corpus of space law to supplement the broad rules established in these early treaties.<sup>107</sup>

*B. The Rescue Agreement of 1968*

Shortly after the debut of the Outer Space Treaty, the COPUOS unveiled the

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99. See *infra* Part IV (analyzing the ambiguities in the existing space law treaties).

100. Vladimir Kopal, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, U.N. AUDIOVISUAL LIBRARY OF INT’L LAW 3, available at [http://legal.un.org/avl/pdf/ha/tos/tos\\_e.pdf](http://legal.un.org/avl/pdf/ha/tos/tos_e.pdf) (last visited Nov. 9, 2017) (on file with *The University of the Pacific Law Review*).

101. *Id.*

102. Grush, *supra* note 90.

103. Kopal, *supra* note 100; Krause, *supra* note 14.

104. Grush, *supra* note 90.

105. Oduntan, *supra* note 39.

106. See Stephen Gorove, *Interpreting Salient Provisions of the Agreement on the Rescue of Astronauts*, 96, in PROCEEDINGS ON THE ELEVENTH COLLOQUIUM ON THE LAW OF OUTER SPACE, INTERNATIONAL INSTITUTE OF SPACE LAW OF THE INTERNATIONAL AERONAUTICAL FEDERATION (Oct. 17–18, 1968) (on file with *The University of the Pacific Law Review*) (explaining, in 1968, that “it is hoped that the initial agreements will be expanded or revised in the light of experience and need”); see also Jeff Foust, *Companies, Lawyers Argue Against Changing Outer Space Treaty*, SPACE NEWS (May 26, 2017), <http://spacenews.com/companies-lawyers-argue-against-changing-outer-space-treaty/> (on file with *The University of the Pacific Law Review*).

107. Masson-Zwaan & Freeland, *supra* note 43, at 1598.

Rescue Agreement.<sup>108</sup> It was the product of an internationally recognized need for a framework governing the rescue and return of astronauts and personnel that first emerged in 1958.<sup>109</sup> By that time, three American astronauts and one Russian cosmonaut had already perished in the line of duty.<sup>110</sup> Pointing to the Apollo 1 and Soyuz 1 disasters, which both occurred after the Outer Space Treaty but before the Rescue Agreement, one scholar notes, “[i]n the limited number of cases where astronauts were in distress little effort was expended to ‘rescue’ them.”<sup>111</sup> Recognizing the broad nature of the rescue and return obligations set forth in its predecessor treaty, the Rescue Agreement was intended to elaborate on the Outer Space Treaty’s duty to rescue.<sup>112</sup>

The Rescue Agreement imposes a duty on States Parties to “immediately take all possible steps to rescue [and assist]” personnel of spacecraft who land in their territory.<sup>113</sup> It also requires States Parties who “are in a position to do so . . . [to] extend assistance in search and rescue operations” for “personnel of a spacecraft” who alight on the high seas or in outer space.<sup>114</sup> Additionally, it requires that all rescued personnel “be safely and promptly returned to representatives of the launching authority.”<sup>115</sup> Because no astronaut has survived such an emergency landing, the Rescue Agreement has never been applied to this situation.<sup>116</sup> The Rescue Agreement is particularly relevant to private spaceflight because it extends the duty to rescue to “personnel of a spacecraft,” which States Parties may interpret as applying to civilian spaceflight passengers.<sup>117</sup>

#### IV. TREATY INTERPRETATION AND THE VIENNA CONVENTION

Both the Outer Space Treaty and the Rescue Agreement fail to define the terms “astronauts” and “personnel.”<sup>118</sup> It remains unclear whether space tourists fall within either of those categories.<sup>119</sup> Therefore, we must use tools of treaty interpretation to derive meaning of these terms.<sup>120</sup> The Vienna Convention is an

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108. Rescue Agreement, *supra* note 8.

109. Zeldine Niamh O’Brien, *The Rescue Agreement and Private Space Carriers*, 51 PROC. INT’L INST. SPACE L. 126, 126 (2008).

110. *Id.*

111. Frans G. von der Dunk, *A Sleeping Beauty Awakens: The 1968 Rescue Agreement After Forty Years*, 34 J. SPACE L. 411, 413, n. 10 (2008) (noting that the *Apollo 1* exploded on the launch pad and the *Soyuz 1* fell to earth and smashed to the ground).

112. O’Brien, *supra* note 109, at 127.

113. Rescue Agreement, *supra* note 8.

114. *Id.* at art. iii.

115. *Id.* at art. iv.

116. Beck, *supra* note 15, at 14.

117. Rescue Agreement, *supra* note 8; *infra* Part IV.

118. Rescue Agreement, *supra* note 8; Outer Space Treaty, *supra* note 9.

119. Freeland, *supra* note 11, at 10.

120. Mark Sundahl, *The Duty to Rescue Space Tourists and Return Private Spacecraft*, 35 J. SPACE L.

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integral tool for interpreting treaties and for understanding the differences between the language used in the Outer Space Treaty and the Rescue Agreement.<sup>121</sup>

The Vienna Convention establishes a framework of interpretive rules that govern international treaties.<sup>122</sup> International consensus exists that “in all matters international, [states should] always interpret in accordance with the rules of the Vienna Convention.”<sup>123</sup> This means that even States which have not ratified the Vienna Convention are generally bound to respect its rules, largely because the Vienna Convention has been accepted as a “codification of customary practice and . . . [is] binding as an expression of customary international law.”<sup>124</sup>

Section A presents the Vienna Convention’s interpretive methodologies that may help give meaning to the terms “astronauts” and “personnel.”<sup>125</sup> Section B analyzes whether, using the interpretive tools of the Vienna Convention, space tourists fall within the meaning of “astronauts” in the Outer Space Treaty.<sup>126</sup> Using the Vienna Convention, Section C clarifies whether space tourists qualify as “personnel of spacecraft” under the Rescue Agreement.<sup>127</sup> Section D addresses the tension between the terms used in these two treaties in light of two interpretive maxims: *lex posterior* and *lex specialis*.<sup>128</sup>

A. Interpretive Methodologies

In interpreting ambiguous terms, “international law permits a reliance on both the ordinary meaning of words and the intention of the drafters at the time of preparation.”<sup>129</sup> Articles 31 through 33 of the Vienna Convention establish a comprehensive process of interpreting treaty language.<sup>130</sup> Pursuant to Article 31, “[a] treaty shall be interpreted . . . in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and

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163, 182 (2009).

121. *Id.*

122. Vienna Convention on the Law of Treaties, May 23, 1969, 1155 U.N.T.S. 331 [hereinafter Vienna Convention]; Jan Klabbers, *Virtuous Interpretation*, in TREATY INTERPRETATION AND THE VIENNA CONVENTION ON THE LAW OF TREATIES: 30 YEARS ON 17, 24 (Malgosia Fitzmaurice, Olufemi Elias & Panos Merkouris, eds., 2010) (“Any order in world politics is only possible . . . if we have some guidance as to how to read the texts that record our agreements. Without such rules, there can be no guarantees that different parties, different states, different interpretive communities, come to radically difficult conclusions as to what it was again we agreed on.”).

123. Klabbers, *supra* note 122, at 24.

124. *Id.*; Sundahl, *supra* note 120, at 176.

125. *Infra* Part IV.A.

126. *Infra* Part IV.B

127. *Infra* Part IV.C.

128. *Infra* Part IV.D.

129. Failat, *supra* note 11, at 122–23.

130. Sundahl, *supra* note 120, at 174.

purpose.”<sup>131</sup> Ordinary meaning encompasses the meaning assigned to the term when the parties signed the treaty.<sup>132</sup> Deciphering a term’s ordinary meaning is critical because it is likely a reflection of the parties’ original intent.<sup>133</sup> Additionally, in interpreting any treaty “[o]ne must look at the treaty as a whole, including the preamble and any annexes,” since it is improper to determine meaning in the abstract.<sup>134</sup>

Furthermore, consideration of the treaty’s object and purpose is vital and requires an assessment of why the treaty exists.<sup>135</sup> Using the object and purpose can “make the meaning of [a vague] provision more precise,” and it may also “help to determine which of . . . two possible meanings is correct” where the ordinary meaning is ambiguous.<sup>136</sup> If the ordinary meaning remains ambiguous after considering the object and purpose, the Vienna Convention allows for the use of supplementary means of interpretation, which generally include *travaux preparatoires*, the historical context surrounding the treaty’s enactment, as well as widely recognized maxims of interpretation.<sup>137</sup>

#### *B. Is a Space Tourist an “Astronaut” Under the Outer Space Treaty?*

The Outer Space Treaty refers to “astronauts” as “envoys of mankind in outer space.”<sup>138</sup> Article V of the Outer Space Treaty establishes a framework for the rescue of “astronauts,” yet does not define who qualifies as an “astronaut.”<sup>139</sup> For many, the word conjures a mental image of “a pressurized suit with various and sundry dials, a sturdy helmet and face mask . . . and perhaps some really thick gloves.”<sup>140</sup> In assigning meaning to this term, it is important to determine its ordinary meaning in light of the treaty’s overall object and purpose.<sup>141</sup>

Subsection 1 explores the historical context of “astronaut” as used in the Outer Space Treaty considering the treaty’s object and purpose.<sup>142</sup> Subsection 2 provides a brief glimpse into the extent notions of training and the distance space tourists travel from Earth may help define “astronaut” as used in the Outer Space Treaty.<sup>143</sup>

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131. Vienna Convention, *supra* note 122, at art. 31(1).

132. Sundahl, *supra* note 120, at 175.

133. ANTHONY AUST, MODERN TREATY LAW AND PRACTICE 235 (2d ed. 2007).

134. *Id.*

135. ULF LINDERFALK, ON THE INTERPRETATION OF TREATIES 204 (Vol. 83, 2007).

136. *Id.* at 203.

137. Vienna Convention, *supra* note 122, at art. 32.

138. Outer Space Treaty, *supra* note 9, at art. v.

139. *Id.*

140. Mirmina, *supra* note 97, at 670.

141. LYALL, *supra* note 24, at 129.

142. *Infra* Part IV.B.1.

143. *Infra* Part IV.B.2.



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1. Historical Context and Purpose of the Outer Space Treaty

When the Outer Space Treaty entered into force, “only governments had the ability to put objects into space and private space use was an impossibility.”<sup>144</sup> “Astronaut” was only understood to include crew on missions sponsored by national governments.<sup>145</sup> While this is instructive, it is also critical to consider the scope of “astronauts” in light of the overarching object and purpose of the treaty itself, as required by the Vienna Convention.<sup>146</sup>

The overall goal of Article V, by its very language, was to require the rescue and return of “astronauts.”<sup>147</sup> The concept of assisting those in distress is not a new idea; instead, rescue has been treated as a “normal moral imperative” in many similar contexts for decades.<sup>148</sup> The preamble to the Outer Space Treaty recognizes the “common interest of all mankind in the progress of the . . . use of outer space for peaceful purposes.”<sup>149</sup> This language acknowledges the impact of outer space activities on all of humanity and suggests the treaty should be interpreted broadly to protect this wide-reaching class of people.<sup>150</sup> In light of the broad purposes of protecting mankind’s interest in outer space and ensuring the rescue of distressed spacefarers, a broad interpretation of “astronaut,” which encompasses space tourists, seems reasonable.<sup>151</sup> If States interpret “astronauts” as only applying to government-sponsored pilots and crew, and excluding paying passengers, it is difficult to see how that result would align with the object of the Outer Space Treaty in “recognizing the common interest of all mankind” because it would compromise the safety of future civilian space travelers.<sup>152</sup>

At the same time, however, many scholars suggest that “astronaut” connotes a more “explorative or scientific meaning, [while] ‘personnel’ has a more functional [or employment-based] meaning,” which suggests the original meaning of “astronaut” would not encompass the modern space tourist.<sup>153</sup> A 1965 dictionary prepared by the United States National Aeronautics and Space Administration (“NASA”) defines an “astronaut” as firstly, a “person who rides

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144. Sundahl, *supra* note 120, at 183; FABIO TRONCHETTI, FUNDAMENTALS OF SPACE LAW AND POLICY 25 (Springer 2013).

145. 1965 Dictionary, *supra* note 52 (setting forth a 1965 definition of “astronaut” which includes the language “one of the test pilots selected to participate in . . . any other United States program for manned spaceflight”); Sundahl, *supra* note 120, at 183.

146. Vienna Convention, *supra* note 122, at art. 31(1).

147. LYALL, *supra* note 24, at 65.

148. *Id.* at 136 (comparing the importance and moral imperative of rescue in the context of “life at sea” with that of outer space).

149. Outer Space Treaty, *supra* note 9, at pmbl.

150. *Id.*

151. *Id.*

152. *Id.*

153. Hobe, *supra* note 11, at 455.

in a space vehicle,” and more specifically, “one of the test pilots selected to participate in Project Mercury, Project Gemini, Project Apollo, or any other United States program for manned spaceflight.”<sup>154</sup> This is an undeniably narrow definition.<sup>155</sup> Under this classification, only those who have been specifically selected by the government or other appropriate authority to participate in a government-sponsored program for manned spaceflight qualify as “astronauts.”<sup>156</sup> Since space tourists are typically not chosen and instead pay money for the opportunity to go to space, and because these flights are not part of a government-sponsored program, space tourists would not fall within this definition.<sup>157</sup>

Overall, the ordinary meaning of “astronaut” remains ambiguous.<sup>158</sup> On the one hand, the Outer Space Treaty’s broad object and purpose suggest that space tourists should be protected as “astronauts.”<sup>159</sup> On the other hand, however, the plain meaning of “astronaut” may suggest that space tourists’ passive role on commercial spaceflights would exclude them from being considered “astronauts.”<sup>160</sup>

## 2. *Astronauts as Trained Professionals*

Some scholars contend that the elements of training and altitude, or distance traveled above Earth, are integral in defining astronauts.<sup>161</sup> The difficulty arises in where to draw the line in determining the “extent of training necessary for a passenger to be considered as ‘a person who has received professional training,’” and also the distance from Earth’s surface one must travel to reach “outer space.”<sup>162</sup> The training offered to civilian space tourists will be rudimentary, and pale in comparison to professional “astronauts” and space tourists who came before them, which suggests that modern space tourists cannot be considered “astronauts.”<sup>163</sup> At the same time, however, space tourists will typically reach an altitude of 62 miles above Earth, which means they will cross the boundary into

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154. 1965 *Dictionary*, *supra* note 52.

155. V.V. Aldoshin, V.D. Bordunov, E.G. Vasilevskaya, et al., 89 MEZH DUNARODNOYE KOMICHESKOYE Pravo, INTERNATIONAL SPACE LAW (A.S. Piradov ed., transl. from Russian) (1974).

156. 1965 *Dictionary*, *supra* note 52.

157. *Id.*; LYALL, *supra* note 24, at 129 (“We do not consider all those on a cruise-liner to be sailors, or passengers on aircraft to be pilots, flight engineers or cabin staff and there is a clear parallel between such cases and touristic space-flight.”).

158. LYALL, *supra* note 24, at 134.

159. See generally Outer Space Treaty, *supra* note 9, at pmb1. (explaining that the treaty was prompted by a recognition of the interests of *all* of humanity).

160. 1965 *Dictionary*, *supra* note 52; LYALL, *supra* note 24, at 129.

161. Failat, *supra* note 11, at 124; LYALL, *supra* note 24, at 131.

162. Failat, *supra* note 11, at 125.

163. LYALL, *supra* note 24, at 132.

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space—the same boundary that professional “astronauts” cross.<sup>164</sup>

As the industry continues to expand, space tourists will likely face fewer obstacles to getting their moment in the stars, including training.<sup>165</sup> In the United States, for example, federal law requires that, at a minimum, spaceflight operators train all spaceflight participants prior to their flight “on how to respond to emergency situations, including smoke, fire, loss of cabin pressure, and emergency exit.”<sup>166</sup> The law leaves the extent of that training to the discretion of the private companies that operate the spaceflights, with some companies touting just one day of training before liftoff.<sup>167</sup>

For example, Blue Origin, a commercial spaceflight company established by Amazon founder and CEO, Jeff Bezos, offers just one day of training prior to departure.<sup>168</sup> Two days before the flight, passengers will travel to the launch site in West Texas.<sup>169</sup> The day before takeoff, they will have an “active and fun day-long session that will help [them] feel comfortable and prepared for . . . [their] responsibilities as an astronaut.”<sup>170</sup> The training includes an overview of the mission space vehicle, safety briefings, a simulated mission, and instructions on procedures, communication, and preparation for their zero-G moment.<sup>171</sup> Some compare preparing for a journey to space to “getting a SCUBA license.”<sup>172</sup>

In contrast, before the first space tourist, Dennis Tito, embarked on his eight-day journey to the ISS, he spent nearly eight months in training.<sup>173</sup> Historically, training included practical survival skills alone in a Russian forest, learning to remove spacesuits in the capsule they would use in their return journey to Earth, and spending days in a “full-size mock-up of the [ISS].”<sup>174</sup> The ISS training also incorporated “simulations of the station catching fire or depressurizing.”<sup>175</sup>

Clarifying the duty to rescue is gaining urgency because future space tourists will receive less comprehensive training than past space tourists and government-

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164. Caughill, *supra* note 62.

165. Matt McFarland, *Space Tourism 101: How to Prepare to Fly Around the Moon*, CNN MONEY (Mar. 1, 2017), <http://money.cnn.com/2017/03/01/technology/spacex-moon-space-tourist/index.html> (on file with *The University of the Pacific Law Review*); LYALL, *supra* note 24, at 132.

166. 14 C.F.R. § 460.51 (2007).

167. See *The Astronaut Experience*, BLUE ORIGIN, <https://www.blueorigin.com/astronaut-experience> (last visited Jan. 6, 2018) (on file with *The University of the Pacific Law Review*) (“The day before launch, you’ll learn everything you need to know to make the most of your experience.”).

168. *Id.*

169. *Id.*

170. *Id.*

171. *Id.*

172. McFarland, *supra* note 165.

173. *Id.*

174. *Id.*

175. *Id.*

sponsored astronauts.<sup>176</sup> Space tourists will be less prepared for emergency situations because they received only one or two days, not months, of training; therefore, they should be given more legal protection.<sup>177</sup>

At this stage in the industry's development, distance traveled and altitude are other fundamental differences between prospective commercial flights and government-sponsored trips.<sup>178</sup> Space tourists who embark on a Virgin Galactic spacecraft, for instance, will travel up to 68 miles above Earth.<sup>179</sup> Space tourists will travel just past the Kármán Line, which historically represents the unofficial boundary between Earth's atmosphere and outer space.<sup>180</sup> On the other hand, government-sponsored trips to the ISS are roughly 240 miles round-trip.<sup>181</sup> While space tourists may technically travel far enough away from Earth's surface to enter outer space, the differences in training between civilian passengers and government-sponsored astronauts is formidable.<sup>182</sup>

Interpreting space tourists as synonymous with "astronaut" is too great of an interpretive leap based on the ordinary meaning of "astronaut" along with the differences in training and altitude, and may even fail to meet the good faith standard required by the Vienna Convention.<sup>183</sup> Given that governments must interpret a treaty in light of its object and purpose, construing "astronauts" to include space tourists aligns with the treaty's overarching goal to promote the wellbeing of humanity.<sup>184</sup> Because there is no definitive answer, the legal community must reconsider the definition of "astronaut" to create a more accurate definition and clarify which duties apply to humans who venture into space.<sup>185</sup>

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176. LYALL, *supra* note 24, at 132.

177. *See id.* 132 (explaining the low requirements for training of modern space tourists).

178. *See* Failat, *supra* note 11, at 124 (explaining that "defining an astronaut should consist of two main considerations: training and altitude").

179. Caughill, *supra* note 62; Mark Malloy, *What is Virgin Galactic and How Much Will it Cost to Travel to Space?*, TELEGRAPH (July 19, 2017), <http://www.telegraph.co.uk/technology/0/virgin-galactic-much-will-cost-travel-space/> (on file with *The University of the Pacific Law Review*) ("SpaceShipTwo will travel at approximately three and a half times the speed of sound, propelling the vehicle and passengers to space.").

180. Gould & Kane, *supra* note 63 (explaining that the Kármán line is at 62 miles, or roughly 100 kilometers, above Earth).

181. Remy Melina, *International Space Station: By the Numbers*, SPACE (Aug. 3, 2017), <https://www.space.com/8876-international-space-station-numbers.html> (on file with *The University of the Pacific Law Review*).

182. *See* Sundahl, *supra* note 120, at 178 (explaining that "the use of the term 'astronaut' . . . could support a narrower reading of the duty to rescue").

183. Vienna Convention, *supra* note 122, at art. 31 ("A treaty shall be interpreted in good faith . . .").

184. *See* Outer Space Treaty, *supra* note 9, at pmbl. (establishing a wide-reaching goal that refers to all of mankind, rather than a specifically delineated category of people).

185. LYALL, *supra* note 24, at 134.

C. Are Space Tourists “Personnel of Spacecraft” Under the Rescue Agreement?

Despite using the term “personnel” to delineate specific duties and obligations, the Rescue Agreement does not define it.<sup>186</sup> The treaty’s preamble explains that the treaty was “prompted by sentiments of humanity,” which suggests that treaty signatories should interpret it expansively to include all persons involved in commercial spaceflight.<sup>187</sup> Also, the unclear definition for what constitutes “personnel” may indicate that it was meant to be a broad concept that extends to passengers aboard both commercial and non-commercial spaceflights.<sup>188</sup> Subsection 1 explores the ordinary meaning of “personnel” in light of the Rescue Agreement’s object and purpose.<sup>189</sup> Subsection 2 analyzes the extent to which absurdity results from a narrow interpretation of “personnel.”<sup>190</sup>

1. Purpose of the Rescue Agreement and Ordinary Meaning of “Personnel” in 1968

As discussed above, the Vienna Convention requires deference to a treaty’s object and purpose when interpreting its terms.<sup>191</sup> The Rescue Agreement’s purpose is to provide for the rescue of “personnel” in emergency situations.<sup>192</sup> It is also motivated by similar considerations as the Outer Space Treaty, as evidenced by its purpose of giving further concrete expression to the rescue-related provisions of the Outer Space Treaty.<sup>193</sup> This suggests that the Rescue Agreement, similar to the Outer Space Treaty, is concerned with protecting the interests of all of mankind and humanity’s use of outer space.<sup>194</sup> In light of the Rescue Agreement’s broad purpose, it would be irrational to interpret “personnel” to exclude paying customers on spaceflights merely because they are not part of the crew.<sup>195</sup>

Turning to the ordinary meaning of the term, “personnel” was defined in 1968 as “persons employed in any work, enterprise, service, etc.”<sup>196</sup> Unlike the

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186. Failat, *supra* note 11, at 122.

187. Freeland, *supra* note 17, at 103–04; Rescue Agreement, *supra* note 8, at pmb1.

188. See Freeland, *supra* note 17, at 103–04 (explaining that “personnel” should be interpreted to cover all people involved in space tourism flights).

189. *Infra* Part IV.C.1.

190. *Infra* Part IV.C.2.

191. Vienna Convention, *supra* note 122, at art. 31(1).

192. Rescue Agreement, *supra* note 8, at art. ii.

193. *Id.* at pmb1.

194. *Id.*; see Outer Space Treaty, *supra* note 9, at pmb1. (setting forth broad purposes of protecting the interest of mankind in space activities).

195. See Outer Space Treaty, *supra* note 9, at pmb1. (demonstrating a very broad object and purpose of protecting the interests of all of mankind); Freeland, *supra* note 17, at 103.

196. Sundahl, *supra* note 120, at 185 (quoting *Personnel*, WEBSTER’S NEW WORLD DICTIONARY

contemporary definition of “astronaut,” this term does not suggest the entanglement of government activity, meaning that the duty to rescue may extend to commercial spaceflight.<sup>197</sup> Under this definition, the pilot and crew are likely “personnel,” while private passengers are not because they are not “employed” on their voyage—they are paying customers.<sup>198</sup>

Article 33(4) of the Vienna Convention provides that the language of treaties authenticated in more than two languages is equally authoritative in each of those languages.<sup>199</sup> Thus, the Chinese, English, French, Russian, and Spanish translations of the Rescue Agreement are equally authoritative.<sup>200</sup> The French version of the Rescue Agreement is particularly interesting because it uses the French word “*equipage*” rather than “*personnel*” to describe to whom the duty to rescue extends.<sup>201</sup> In French, “*equipage*” means “crew” while “*personnel*,” retains the same meaning as in English.<sup>202</sup> Just like the English version, the French version of Article VIII of the Outer Space Treaty refers to “*personnel*.”<sup>203</sup> This divergence suggests that the use of “*equipage*,” rather than “*personnel*” was intentional and reflected the drafters’ true intent to encompass a narrower category of people.<sup>204</sup> This is because “crew” is more specific than “personnel,” in that it more directly refers to people who are employed to work aboard a spacecraft.<sup>205</sup> This distinction may suggest that a narrower reading of “personnel” is appropriate—one that mandates an employment relationship.<sup>206</sup>

This conclusion is consistent with the United States’ approach to differentiating “crew” from space tourists, also known as “spaceflight

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(1968)). The Second Edition of the *Oxford English Dictionary* (released in 1989) defines “personnel” as “the body of persons engaged in any service or employment.” *Personnel*, OXFORD ENGLISH DICTIONARY (2d ed. 1989).

197. Sundahl, *supra* note 120, at 185.

198. *Id.*

199. Vienna Convention, *supra* note 122, at art. 33(4).

200. Rescue Agreement, *supra* note 8, at art. x.

201. Accord sur le sauvetage des astronautes, le retour des astronautes et la restitution des objets lancés dans l’espace extra-atmosphérique, arts. 1, 2, 3, 4, Dec. 3, 1968, 19 U.N.T.S. 7570, T.I.A.S. No. 6599.

202. *Equipage*, COLLINS DICTIONARY, <https://www.collinsdictionary.com/dictionary/french-english/C3%A9quipage> (last visited Mar. 24, 2018) (on file with *The University of the Pacific Law Review*).

203. Traité sur les principes régissant les activités des Etats en matière d’exploration et d’utilisation de l’espace extra-atmosphérique, y compris la Lune et les autres corps célestes, art. VIII, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205.

204. *Id.*

205. See *Crew*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/crew> (last visited Mar. 24, 2018) (on file with *The University of the Pacific Law Review*) (“Crew” means “the persons who have duties on an aircraft in flight” or “a company of people working on one job”); see also *Personnel*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/personnel> (last visited Mar. 24, 2018) (on file with *The University of the Pacific Law Review*) (in contrast, “personnel” means “a body of persons usually employed”).

206. Compare *Crew*, *supra* note 205 (“Crew” means “the persons who have duties on an aircraft in flight” or “a company of people working on one job”), with *Personnel*, *supra* note 205 (in contrast, “personnel” means “a body of persons usually employed”).

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participants.”<sup>207</sup> The United States’ Commercial Space Launch Amendments Act of 2004 (“CSLAA”) defines a “spaceflight participant” as “an individual, who is not crew, carried within a launch vehicle or reentry vehicle.”<sup>208</sup> The employment relationship thus appears to be a distinguishing factor separating space tourists from “personnel.”<sup>209</sup> While the object and purpose of the Rescue Agreement support a broad reading of “personnel,” dictionaries and translations of the treaty suggest a narrower meaning.<sup>210</sup>

2. *Avoiding Absurdity*

Article 32 of the Vienna Convention permits supplementary means of interpretation when the interpretation “leads to a result which is manifestly absurd or unreasonable.”<sup>211</sup> As explained in Part I of this Comment, distinguishing space tourists from “personnel” produces absurd results.<sup>212</sup> If crew are “personnel,” but passengers are not, the rescue and return obligations “would only extend to some of those onboard a space tourism flight—for example the crew—but not to the paying passengers.”<sup>213</sup>

Using the hypothetical presented at the beginning of this Comment, and assuming there are no other binding international obligations to rescue or return those individuals, the Chinese spacecraft would have an obligation to rescue the crew and pilots, but would be free to leave the passengers behind.<sup>214</sup> In the event of an emergency, rather than rescuing the most injured people first, the rescuers would need to first identify which individuals are afforded protection under the existing legal framework by distinguishing paying passengers from members of the crew.<sup>215</sup> This scenario would create an absurd distinction between those who pay to be on the flight and those who get paid and would require an impractical preliminary assessment by rescuers.<sup>216</sup>

Since “personnel” may be interpreted to either include or exclude space tourists,<sup>217</sup> and in light of the absurdity that may result from a narrow

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207. Compare 51 U.S.C.A. § 50902(2) (West 2015) (defining crew), with *id.* § 50902(20) (defining spaceflight participants).

208. *Id.* § 50902(20).

209. Sundahl, *supra* note 120, at 185.

210. See *id.* (presenting an argument for a narrower reading of “astronauts” and “personnel”); see also Rescue Agreement, *supra* note 8, at pmb1. (setting forth a broad, over-arching purpose which appears to encompass all of mankind).

211. Vienna Convention, *supra* note 122, at art. 32.

212. Freeland, *supra* note 17, at 103.

213. *Id.*

214. See generally *id.* (describing the absurdity of a narrow reading of “personnel”).

215. See generally *id.* (explaining the strange outcome of interpreting “personnel” narrowly).

216. *Id.*

217. See *supra* Part IV.C.1.

interpretation,<sup>218</sup> this issue demands immediate clarification.<sup>219</sup> Undeniably, the ambiguity surrounding the applicability of “personnel” to space tourists signals the need to update this antiquated corpus of space law.<sup>220</sup>

D. *Ordinary Meaning in Light of Lex Posterior and Lex Specialis*

The Vienna Convention permits the use of supplementary means of interpretation when deciphering otherwise ambiguous meanings of a term.<sup>221</sup> For example, under the *lex posterior derogate priori* principle (“*lex posterior*”), if “two conflicting treaties deal with the same subject matter and are concluded by the same parties,” then the later treaty supersedes the earlier one.<sup>222</sup> This principle demonstrates the tension between the Outer Space Treaty and the Rescue Agreement because both treaties deal with States Parties’ obligations to rescue individuals in emergency situations.<sup>223</sup> Some scholars contend that the term “astronaut” does not possess “any operative force in the context of rescue and return” because, based on *lex posterior*, the Rescue Agreement supersedes Article V of the Outer Space Treaty.<sup>224</sup> Therefore, it is critical to decide whether the Rescue Agreement deprives “astronaut” of all meaning in the context of defining space tourists under *lex posterior*.<sup>225</sup>

1. *Lex Posterior: Does the Rescue Agreement Supersede the Outer Space Treaty’s Rescue and Return Provisions?*

Consistent with the *lex posterior* principle, a later treaty may supersede an earlier one only if the provisions of both treaties conflict.<sup>226</sup> Where the latter treaty does not expressly revoke the former one, it must be clear that the two treaties are “wholly irreconcilable . . . [and] that the two cannot reasonably co-

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218. See *supra* Part IV.C.2.

219. Freeland, *supra* note 17, at 103, 104.

220. Yun, *supra* note 25, at 982.

221. Vienna Convention, *supra* note 122, at art. 32.

222. Ahmad Ali Ghouri, *Determining Hierarchy Between Conflicting Treaties: Are There Vertical Rules in the Horizontal System?*, 2 ASIAN J. INTL L. 1, 17 (2012). In 1855, the High Court of Admiralty (which was ultimately absorbed into the High Court of Justice) clarified and employed this maxim when addressing a conflict between a 1670 treaty between Great Britain and Denmark, a 1661 treaty between Great Britain and Sweden, and an 1801 treaty between Russia and England. *The Franciska*, 2 Eng. Pr. Cas. 371, 404 (1855) (in REPORTS OF PRIZE CASES DETERMINED IN THE HIGH COURT OF ADMIRALTY (E.S. Roscoe ed., vol. 2, 1905)) (“In order to constitute revocation by implication, the inference must be free from doubt; it must be proved that . . . the two cannot reasonably co-exist together. The presumption is against such a revocation.”).

223. Sundahl, *supra* note 120, at 177.

224. *Id.* at 179.

225. See *id.* at 177 (explaining the importance of clarifying the relationship between the Outer Space Treaty and Rescue Agreement in order to fully understand the duty to rescue and return).

226. *Id.*



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exist together.”<sup>227</sup> The Rescue Agreement is silent as to whether it supersedes the Outer Space Treaty’s rescue obligations, which may be interpreted “as an intent to uphold the continued validity of the previous treat[y].”<sup>228</sup>

Nevertheless, these two treaties are still reconcilable because they both generally provide for nearly identical rescue obligations and the existing differences are minimal.<sup>229</sup> They differ to the extent that the Rescue Agreement requires the return of rescued “personnel” to the launching authority, while the Outer Space Treaty mandates the return of “astronauts” to the state of registry for their spacecraft—a location which may differ from the origin of the launching authority.<sup>230</sup> Additionally, the Outer Space Treaty uses the terms “astronauts” and “envoys of mankind” while the Rescue Agreement refers to “personnel of spacecraft.”<sup>231</sup> Finally, the Rescue Agreement establishes a broader geographic coverage by extending the duty to rescue to any “place not under the jurisdiction of any State,” which can encompass, among other areas, outer space.<sup>232</sup>

Pursuant to the *lex posterior* principle, the differences between these two treaties are not irreconcilable and the Rescue Agreement should be interpreted as supplementing (rather than superseding) the terms of the Outer Space Treaty.<sup>233</sup> The preamble of the Rescue Agreement supports this result as it notes the “great importance” of the Outer Space Treaty and expresses a desire “to develop and give further concrete expression to” the duties set forth in the Outer Space Treaty.<sup>234</sup> This language, coupled with the Rescue Agreement’s silence as to whether it supersedes the relevant provisions of the Outer Space Treaty, both support the conclusion that if the drafters of the Rescue Agreement had intended supersession, they would have stated that intent clearly.<sup>235</sup> That said, many scholars agree that the *lex posterior* principle often fails to provide certainty in

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227. The *Franciska*, 2 Eng. Pr. Cas. 371, 404 (1855) (in REPORTS OF PRIZE CASES DETERMINED IN THE HIGH COURT OF ADMIRALTY (E.S. Roscoe ed., vol. 2, 1905)).

228. Hans Aufricht, *Supersession of Treaties in International Law*, 37 CORNELL L. REV. 655, 659 (1952).

229. Compare Rescue Agreement, *supra* note 8 (requiring that a Contracting Party “immediately take all possible steps to rescue . . . and render . . . all necessary assistance” to “personnel of spacecraft [that] land in territory under the[ir] jurisdiction”), with Outer Space Treaty, *supra* note 9 (mandating that States Parties “render . . . all possible assistance” to astronauts that land in territory under their jurisdiction or on the high seas).

230. Rescue Agreement, *supra* note 8, at art. iv; Outer Space Treaty, *supra* note 9, at art. v.

231. Rescue Agreement, *supra* note 8, at arts. ii–iv; Outer Space Treaty, *supra* note 9, at art. v.

232. Compare Rescue Agreement, *supra* note 8, at arts. ii–iv (extending the duty to rescue to the high seas, territory of the contracting party, and places that are not under the jurisdiction of any state), with Outer Space Treaty, *supra* note 9, at art. v. (extending the duty to rescue to the high seas and to the territory of the State Party, not to territory that isn’t under the jurisdiction of any state).

233. Sundahl, *supra* note 120, at 177 (conceding that the Rescue Agreement “elaborates upon” and “adds to” the OST).

234. Rescue Agreement, *supra* note 8.

235. Aufricht, *supra* note 228, at 659.

resolving differences between treaties.<sup>236</sup> Based on that insufficiency, another rule is often invoked: *lex specialis*.<sup>237</sup>

2. *Lex Specialis: Does the Rescue Agreement Invalidate the Narrower Duty to Rescue “Astronauts” Under the Outer Space Treaty?*

Article V of the Outer Space Treaty uses the narrower term “astronaut,” which implies a certain level of training or government-sponsored conduct, while the Rescue Agreement uses the broader term “personnel of spacecraft.”<sup>238</sup> Because of this tension between general and specific terms, the interpretive principle *lex specialis derogate generali* (“*lex specialis*”), which provides that specific rules trump general ones, may help resolve interpretive confusion.<sup>239</sup>

As a general rule, if the later treaty has a broader scope than the earlier one, *lex posterior generalis non derogate prior specialis* applies.<sup>240</sup> Under that principle, “a later, general law does not repeal an earlier, specialized law.”<sup>241</sup> In the context of these two treaties, the application of this principle means that the Outer Space Treaty “will be construed to remain in effect as a qualification of or exception” to the more general provisions of the Rescue Agreement.<sup>242</sup>

In this context, these maxims are merely “*possible* aids to interpretation” and should not be used rigidly.<sup>243</sup> Additionally, several scholars point out that often times, *lex specialis*, *lex posterior*, and other interpretive maxims are equally lacking because they fail to provide a clear solution to treaty conflicts.<sup>244</sup> Therefore, in interpreting these antiquated treaties, modern scholars should not quickly dismiss the Outer Space Treaty’s provisions relating to the duty to rescue as superseded by the language from the Rescue Agreement.<sup>245</sup> Instead, it is reasonable to interpret the Rescue Agreement as developing and specifying the duties established in the Outer Space Treaty. The Rescue Agreement’s emphasis on the importance of its predecessor treaty and goal of “develop[ing] and giv[ing] further concrete expression” to the Outer Space Treaty further buttresses this theory.<sup>246</sup>

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236. Ghouri, *supra* note 222, at 17, 18.

237. *Id.* at 18.

238. See Sundahl, *supra* note 120, at 178 (explaining that “the use of the term ‘astronaut’ . . . could support a narrower reading of the duty to rescue”).

239. AUST, *supra* note 133, at 249.

240. Aufrecht, *supra* note 228, at 698.

241. AARON FELLMETH & MAURICE HORWITZ, GUIDE TO LATIN IN INTERNATIONAL LAW 174 (2009).

242. SUTHERLAND STATUTES AND STATUTORY CONSTRUCTION § 23:15 (7th ed. 2017).

243. AUST, *supra* note 133, at 248.

244. Ghouri, *supra* note 222, at 18.

245. See AUST, *supra* note 133, at 248 (explaining that the maxims should not be used rigidly so as to avoid absurd results).

246. Rescue Agreement, *supra* note 8, at pmb1.; G.P. Zhukov, *International Cooperation on the Rescue of Astronauts*, 125, in PROCEEDINGS ON THE ELEVENTH COLLOQUIUM ON THE LAW OF OUTER SPACE,

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Overall, the meaning of both “astronauts” and “personnel,” as used in these treaties, remains ambiguous.<sup>247</sup> Space tourists are neither categorically excluded nor included in the scope of these treaties, which exposes them to serious risks depending on how States decide to interpret these provisions.<sup>248</sup> This ambiguity signals an urgent need for change in the legal framework governing the duty to rescue.<sup>249</sup> This change should clarify whether States have an obligation to rescue space tourists to the same extent as others on board a distressed spacecraft.<sup>250</sup>

V. CRAFTING A NEW REGIME FOR COMMERCIAL SPACE TOURISM

It remains unsettled whether space tourists enjoy the protected status of “astronauts” or “personnel,” and whether rescuers must rescue the crew, but not the passengers, of stranded spacecrafts.<sup>251</sup> Thus, as space tourists embark on these inherently dangerous voyages, the lack of legal certainty concerning rescue further jeopardizes their physical safety.<sup>252</sup>

Several mechanisms are available internationally to ensure that the duty to rescue extends to all passengers on a spacecraft, not just to the crew and pilots.<sup>253</sup> The ambiguity that has emerged from these Cold War-era treaties begs the question: what should we do about it?<sup>254</sup> There are many different ways to address this issue; some methods will be more successful than others due to the unique nature of this industry and the need to resolve this problem internationally.<sup>255</sup> Because of the urgent demand for legal certainty in this budding industry, this Comment first proposes provisions to remedy this ambiguity.<sup>256</sup> It then proposes three mechanisms to bring those provisions to life, each with its own benefits and liabilities and each tailored to the short-, medium-,

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INTERNATIONAL INSTITUTE OF SPACE LAW OF THE INTERNATIONAL AERONAUTICAL FEDERATION (Oct. 17–18, 1968).

247. Sundahl, *supra* note 120, at 182.

248. *See id.* (noting the ambiguity as to whether “the law only requires states to rescue crew members, or private passengers as well”).

249. *Id.*

250. *Id.* at 200.

251. *See* Failat, *supra* note 11, at 122 (explaining the legal issues surrounding the ambiguous terminology).

252. *See id.* (noting that it is unclear whether space tourists fit within the protected categories of “astronauts” and “personnel”).

253. Zledine Niamh O’Brien, *Liability for Injury, Loss or Damage to the Space Tourist*, 47 PROC. ON L. OUTER SPACE 386, 388–89 (2004).

254. *See* Yun, *supra* note 25, at 982 (explaining that a new stable regime is vital to assuring the vitality of the space tourism industry).

255. *See* O’Brien, *supra* note 253, at 388–89 (chronicling the benefits and liabilities of potential mechanisms to effect change in the space law arena).

256. *Infra* Part V.B.

and long-term resolution of the existing ambiguity.<sup>257</sup>

Section A proposes specific language that helps resolve the ambiguity, and that should be implemented into any short-, medium-, or long-term solution.<sup>258</sup> Section B presents a short-term solution by proposing a more practical and immediate remedy: adopting a UN General Assembly Resolution to provide guidance for national legislation.<sup>259</sup> Section C proposes a new multilateral agreement between States Parties to the Rescue Agreement and, preferably, States Parties to the Outer Space Treaty, which would be an ideal medium-term solution.<sup>260</sup> Finally, Section D elaborates on a viable long-term solution to this issue—a new UN convention for manned spaceflight that addresses the legal issue presented in this Comment, as well as the plethora of new legal issues that have arisen in the age of commercial space tourism.<sup>261</sup>

*A. Substance of the Proposed Solutions: Where Should We Go from Here?*

To establish certainty in the legal framework for the commercial space tourism industry, and to ensure that space tourists receive the same protections as those who accompany them on their journey, two primary issues must be addressed.<sup>262</sup> First, any new agreement, resolution, or treaty should define “crew” and “spaceflight participant” and distinguish the two terms.<sup>263</sup> Second, it should also include language that expressly provides that spaceflight participants (or space tourists) fall within the meaning of “astronauts” and “personnel” under both the Outer Space Treaty and the Rescue Agreement.<sup>264</sup>

The International Space Station Inter-Governmental Agreement (“ISS IGA”)<sup>265</sup> and the associated Multilateral Crew Operations Panel Agreement

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257. *Infra* Parts V.C–E.

258. *Infra* Part V.A.

259. *Infra* Part V.B.

260. *Infra* Part V.C.

261. *Infra* Part V.D.

262. *See generally* Yun, *supra* note 25, at 982 (explaining the benefits of a stable and predictable legal regime).

263. *See id.* at 979–80 (drawing on definitional sections of the ISS IGA and United States national space law to propose a resolution to the ambiguity presented in the Rescue Agreement).

264. *See* Karl-Heinz Bockstiegel, Vladen Vereshchetin & Stephen Gorove, *Draft Convention on Manned Space Flight*, OPS-ALASKA art. 6 (1990), available at [http://ops-alaska.com/IOSL/V7P1/1990\\_MannedSpaceFlightConvention\\_EN.pdf](http://ops-alaska.com/IOSL/V7P1/1990_MannedSpaceFlightConvention_EN.pdf) [hereinafter “Draft Convention”] (on file with *The University of the Pacific Law Review*) (proposing a provision expressly including space tourists within the meaning of “astronaut” and “personnel” under the Outer Space Treaty and the Rescue Agreement).

265. Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, Jan. 29, 1998, 37 I.L.M. 1495, available at <https://www.state.gov/documents/organization/107683.pdf> [hereinafter ISS IGA] (on file with *The University of the Pacific Law Review*).

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(“MCOP Agreement”)<sup>266</sup> provide a useful starting point in crafting the language of any proposed solution.<sup>267</sup> The ISS IGA “establishes a long-term international cooperative framework . . . for the design, development, operation, and utilization of . . . [the] International Space Station.”<sup>268</sup> The MCOP Agreement provides a mechanism for coordinating and resolving matters involving the crew of the ISS, including “processes, standards, and criteria for selection, certification, assignment, and training.”<sup>269</sup> In Article III, the definitional section, the MCOP Agreement differentiates between professional “astronauts” and “spaceflight participants.”<sup>270</sup> It defines “spaceflight participants” as “individuals (e.g. commercial, scientific and other programs; crewmembers of non-partner space agencies, engineers, scientists, teachers, journalists, filmmakers or tourists) sponsored by one or more partner(s).”<sup>271</sup> On the other hand, a “professional astronaut” is “an individual who has . . . been qualified as such at the space agency of one of the ISS partners and is employed on the staff of the crew office of that agency.”<sup>272</sup>

Several scholars agree the MCOP Agreement’s definitions may become the industry standard.<sup>273</sup> These regulations have “helped to develop soft law rules of a legally binding character, which . . . provide security and certainty in relation to passengers traveling to the ISS.”<sup>274</sup> This demonstrates the value of these terms in the wider context of international space law and the possibility of transitioning non-binding provisions into binding law over time.<sup>275</sup>

The United States’ approach to differentiating crew from spaceflight participants is also instructive.<sup>276</sup> Under U.S. law, a “spaceflight participant” is “an individual, who is not crew, carried within a launch vehicle or reentry vehicle.”<sup>277</sup> This definition appears to be a catchall, encompassing all individuals

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266. The Principles Regarding Processes and Criteria for Selection, Assignment, Training, and Certification of ISS (Expedition and Visiting) Crewmembers (*Multilateral Crew Operations Panel*, Nov. 2001), <http://www.spaceref.com/news/viewsr.html?pid=4578> [hereinafter “MCOP Agreement”] (on file with *The University of the Pacific Law Review*).

267. Yun, *supra* note 25, at 980.

268. *The Legal Framework for the International Space Station*, U.N. COMM. ON THE PEACEFUL USES OF OUTER SPACE LEGAL SUBCOMM. 4 (Apr. 17, 2013), available at <http://www.unoosa.org/pdf/pres/1sc2013/tech-05E.pdf> (on file with *The University of the Pacific Law Review*).

269. Tara Miller, *Partnership – The Way of the Future for the International Space Station*, NPMA (2004), available at <http://c.ymcdn.com/sites/www.npma.org/resource/resmgr/AssetArch/Vol.16-5-Miller.pdf> (on file with *The University of the Pacific Law Review*).

270. Failat, *supra* note 11, at 126.

271. MCOP Agreement, *supra* note 266, at art. III.

272. *Id.*

273. Failat, *supra* note 11, at 127.

274. *Id.*

275. *See id.* (explaining that the ISS regulations have solidified into hard law of a legally binding nature).

276. *See id.* at 127–28 (exploring the United States’ approach to this issue).

277. 51 U.S.C.A. § 50902(20) (West 2015); *see id.* § 50902(2) (crew means “any employee . . . who

who are not employed as crew members.<sup>278</sup> However, some ambiguity remains because this definition does not, but should, extend to moments when a spaceflight participant is not seated inside the space vehicle, such as when they are disembarking.<sup>279</sup> Additionally, as defined under U.S. law, a space station such as the ISS likely would not fall within the category of “launch vehicle or reentry vehicle,” leaving space tourists exposed to the same risks this proposal is meant to avoid.<sup>280</sup>

A hybrid approach integrating the definitions in both the MCOP Agreement and U.S. law would be useful, and should include the following language:

“Spaceflight participants” are individuals (including, but not limited to, tourists, crewmembers of non-partner space agencies, engineers, scientists, teachers, journalists, and filmmakers) who are passengers on a spacecraft for a commercial or government operated spaceflight.<sup>281</sup> “Spaceflight” includes travelling either from Earth to outer space, within outer space, or launching with the intention of reaching outer space, and also extends to the “embarkation, launch, in orbit, deorbit, reentry, landing, and disembarkation phases.”<sup>282</sup>

By expressly noting the term’s application to both private and public space expeditions, it will apply, for example, to both commercial spaceflight passengers (such as those who purchase tickets with SpaceX or Virgin Galactic) and also to private individuals who are taken to the ISS by government-sponsored space vehicles.<sup>283</sup> Additionally, this definition clarifies that the duty to rescue occurs during all stages of the flight, even if the vehicle never reaches outer space.<sup>284</sup> This definition should be integrated into each of the approaches presented in Sections B, C, and D of this Part.<sup>285</sup>

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performs activities in the course of that employment directly relating to the launch, re-entry, or other operation of . . . a launch vehicle . . . that carries human beings.”).

278. See *id.* § 50902(20) (using the language “an individual . . . carried within a launch or reentry vehicle” who is not crew).

279. See *id.* (only applying to situations where spaceflight participants are “carried within” a vehicle, which implies that the status does not extend to when they are not carried within such a vehicle).

280. See *id.* § 50902(11) (“launch vehicle” means a vehicle built to operate in, or place a payload or human beings in, outer space; and a suborbital rocket); see also *id.* § 50902(19) (“reentry vehicle” means a vehicle designed to return from Earth orbit or outer space to Earth, or to a reusable launch vehicle designed to return from Earth orbit or outer space to Earth, substantially intact.”).

281. See Failat, *supra* note 11, at 127 (applauding the MCOP Agreement definition as trendsetting); see also *id.* at 128 (noting that the United States definition helped provide legal certainty and explaining that the categorization under the MCOP and CSLAA were a “vital development for the space tourism industry.”).

282. Draft Convention, *supra* note 264, at art. 6; Sundahl, *supra* note 120, at 194.

283. Sundahl, *supra* note 120, at 193.

284. *Id.* at 195.

285. *Infra* Parts V.B–D.

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Furthermore, to ensure passengers are included within the meaning of “astronauts” and “personnel” under the Outer Space Treaty and the Rescue Agreement, any proposal should include the following language:

States shall regard any person in outer space or on board a commercial or state-sponsored launch or reentry vehicle as “astronauts” within the meaning of Article V of the Outer Space Treaty and as “personnel of spacecraft” within the meaning of the Rescue Agreement.<sup>286</sup>

This language eliminates the interpretive issues presented by these agreements and makes these treaties applicable to the new era of commercial space tourists.<sup>287</sup> Each of the three mechanisms proposed in Sections B, C, and D of this Part should include these substantive provisions.<sup>288</sup>

*B. Proposed Mechanism for a Short-Term Solution: UN General Assembly Resolution Supported by National Legislation*

As history has shown, the process of developing the corpus of international space law will be arduous.<sup>289</sup> At the same time, space tourism has quickly become a reality, and the need for a clear legal framework is more apparent than ever.<sup>290</sup> To promote predictability and permit the healthy growth of this budding industry, it will be critical to address the shortcomings of the existing body of space law.<sup>291</sup> This means that a short-term solution that allows for quick resolution of existing ambiguities is necessary.<sup>292</sup> To counteract the drawbacks of using a non-binding soft law approach to effect immediate change, a binding short-term solution must accompany the soft law mechanism.<sup>293</sup>

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286. See Draft Convention, *supra* note 264, at art. 6 (establishing model language for any proposed convention on this issue); see also Sundahl, *supra* note 120, at 193 (emphasizing that the terms should be defined to include everyone on board a spacecraft).

287. See Sundahl, *supra* note 120, at 193 (exploring the ambiguity as to whether the duty to rescue extends to commercial ventures).

288. *Infra* Parts V.B–D.

289. See Sundahl, *supra* note 120, at 198 (explaining the obstacles of making changes to the current law).

290. Beck, *supra* note 15, at 37.

291. *Id.*

292. See Freeland, *supra* note 17, at 93 (noting the significant task of developing a comprehensive framework for international space law moving forward).

293. See Jose Monserrat Filho & Alvaro Fabricio dos Santos, *Is There a Future for Space Law Beyond “Soft Law”?*, 53 PROC. INT’L INST. SPACE L. 234, 240 (2010) (explaining the benefits of “hard law”).

*1. A Soft Law Approach: UN General Assembly Resolution*

Soft law refers to a set of rules that are “neither strictly binding nor completely lacking legal significance.”<sup>294</sup> They generally act as codes of conduct that are not legally binding.<sup>295</sup> Historically, soft law has “played a singular and virtuous role as a recommendation, an orientation, [and] a point of reference for voluntary conduct by the States and the international intergovernmental organizations” in the realm of space law.<sup>296</sup> Soft law is frequently a response to the desires of a large number of States and breaks the barriers accompanying decisions requiring consensus of the parties, including an inability to obtain the requisite number of signatures to enact a change.<sup>297</sup> In a field such as space law, where there are many interested States, each with its own unique agendas, a soft law approach will allow the necessary changes to be made while avoiding the obstacles presented by more formal methods, such as amendments.<sup>298</sup>

That does not mean, however, that soft law has no disadvantages.<sup>299</sup> In the context of space law, soft law is largely dependent on “compliance rather than enforcement” meaning that “different participants . . . may interpret it differently, leading to a lack of consistency and uniformity of practice.”<sup>300</sup> In that sense, “hard law” (such as treaties and multilateral agreements) provides the predictability and certainty that is arguably needed in a developing industry such as commercial spaceflight.<sup>301</sup> That said, soft law has the potential to harden over time and usually is a step toward developing a binding norm or custom.<sup>302</sup>

In the specific context of the legal status of space tourists, a soft law approach in the form of a non-binding UN General Assembly Resolution setting forth a model policy for States to follow when enacting their own domestic legislation would be a viable starting point.<sup>303</sup> These guidelines would not be legally binding but would have the advantage of being “drafted by a single body with extensive knowledge and understanding of the field.”<sup>304</sup> The resolution would be similar to the one adopted by the UN General Assembly in 2013, which outlined how national legislation can comply with the provisions of the OST.<sup>305</sup>

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294. *Soft Law*, BLACK’S LAW DICTIONARY (10th ed. 2014).

295. *Id.*

296. Filho & Fabricio dos Santos, *supra* note 293, at 236.

297. *Id.* at 237.

298. *Id.*

299. *Id.* at 239.

300. *Id.* at 237, 239 (noting that “[a]ccording to the European Parliament, ‘soft law’ is ‘an ambiguous and ineffective instrument’ and it ‘cannot be a substitute for legal acts and instruments’”).

301. *Id.* at 240.

302. *Id.* at 243.

303. O’Brien, *supra* note 253, at 388.

304. *Id.*

305. G.A. Res. 68/74, Recommendations on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space (Dec. 16, 2013).



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Ideally, the resolution would become “binding upon private actors by inclusion in national space law” as it sets the “best practice” for the industry.<sup>306</sup>

Admittedly, this approach, if taken by itself, would likely be ineffectual in the short-term and might even leave the law uncertain for too long.<sup>307</sup> However, it would provide model guidelines for national legislation which could help streamline the domestic development of this fledgling industry for the immediate future.<sup>308</sup> Therefore, to be effective in the short-term this method *must* be coupled with a push for national legislation among space-faring nations to help resolve this ambiguity.<sup>309</sup>

2. Using National Law and the Drawbacks of Doing So

The limited effectiveness of a soft law approach will be minimized if the soft law is accompanied by a strengthened national effort to address these issues in domestic legal systems.<sup>310</sup> Although defining space tourists’ legal status under the existing international legal framework is an issue of international law, domestic efforts to define the term are a useful starting point.<sup>311</sup> Encouraging States to develop their domestic space laws will create a platform for that same development on an international scale.<sup>312</sup> These domestic policies may help pave the way for the future of space law in the international arena, and might even mature into new multilateral agreements.<sup>313</sup>

A significant hurdle to this approach is that “[m]any non-space faring states may see no reason and have no motivation” to pursue these issues on a domestic level.<sup>314</sup> However, as one commentator noted, 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

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306. Irmgard Marboe, *Space Law Treaties and Soft Law Development*, UNITED NATIONS/CHINA/APSCO WORKSHOP ON SPACE LAW (Nov. 2014), available at <http://www.unoosa.org/documents/pdf/spacelaw/activities/2014/pres02E.pdf> (on file with *The University of the Pacific Law Review*).

307. O’Brien, *supra* note 253, at 388.

308. Krause, *supra* note 14 (chronicling the UN’s past efforts to help shape national legislation in the realm of space law).

309. See Filho & Fabricio dos Santos, *supra* note 293, at 238 (noting that soft law, alone, will result in chaos).

310. Krause, *supra* note 14 (explaining that, in reference to the 2013 UN General Assembly Resolution, space-faring nations that attempt to pass legislation regarding space activities are guided by the principles set forth in the resolution).

311. Beck, *supra* note 15, at 32.

312. Michael Listner, *It’s Time to Rethink International Space Law*, SPACE REVIEW (May 31, 2005), <http://www.thespacereview.com/article/38/1> (on file with *The University of the Pacific Law Review*).

313. *Id.*

314. O’Brien, *supra* note 253, at 389.

interests in play.<sup>315</sup>

Critics of using a national approach to reform space law complain that the law will “develop in an incremental and haphazard way, lacking uniformity on the world stage and potentially within the state itself.”<sup>316</sup> By modeling national legislation on the UN resolution mentioned above, this problem would certainly be lessened because States could model their policies based on the published UN guidelines.<sup>317</sup>

*C. Proposed Mechanism for a Medium-Term Solution: Multilateral Agreement on Treaty Interpretation*

Article 31(3)(a) of the Vienna Convention provides that where a treaty’s terms remain ambiguous, States may base their interpretation of those terms on a “subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions.”<sup>318</sup> Generally, States may freely enter international agreements in relation to space activities.<sup>319</sup> Specifically, if it becomes apparent that “commercially delivered spacefarers will be denied rescue or return because they are not considered ‘astronauts’ [or ‘personnel’] under the treaties, then States might consider an ‘agreed interpretation’ of the existing treaties (either bilaterally or multilaterally) to resolve any perceived ambiguity in terminology.”<sup>320</sup> This approach differs from the treaty proposed in the following subsection in that it relates solely to the applicability of the duty to rescue and return to space tourists, not to the entire commercial spaceflight industry.<sup>321</sup> Because of the narrowed scope of this agreement, it may be easier to attain widespread support.<sup>322</sup>

One distinct advantage of this approach, as opposed to amending the existing space law treaties, is that the amendment process is often long and uncertain.<sup>323</sup> To amend either the Rescue Agreement or Outer Space Treaty, a majority of States Parties must accept any proposed amendment.<sup>324</sup> In contrast, a new multilateral treaty would be useful since fewer States would need to agree, meaning the process would likely be much faster.<sup>325</sup> Scholars seem to agree that

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315. Krause, *supra* note 14.

316. O’Brien, *supra* note 253, at 389.

317. Krause, *supra* note 14 (explaining that prior similar UN resolutions have helped shape national efforts to regulate space activities).

318. Vienna Convention, *supra* note 122, at art. 31(3)(a).

319. INTERNATIONAL SPACE LAW 81 (Boris Belitsky trans., A.S. Piradov ed., 1976).

320. Mirmina, *supra* note 97, at 677.

321. *Infra* Part V.D.

322. O’Brien, *supra* note 253, at 388.

323. AUST, *supra* note 133, at 241.

324. Outer Space Treaty, *supra* note 9, at art. xv; Rescue Agreement, *supra* note 8, at art. viii.

325. O’Brien, *supra* note 253, at 388.

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subsequent interpretive agreements are particularly helpful to update terminology used in antiquated treaty language.<sup>326</sup>

At the same time, this approach may result in the development of a law that lacks global uniformity.<sup>327</sup> Therefore, “consistency across various jurisdictions” would be a concern.<sup>328</sup> Because some States Parties to the Outer Space Treaty and Rescue Agreement may not feel compelled to enter a new agreement for a variety of reasons, the new multilateral agreement would have a more limited geographical scope in terms of likely signatories.<sup>329</sup> That said, this approach would likely be an efficient way to help create certainty in an otherwise ambiguous legal field as long as the major space-faring nations agree to participate.<sup>330</sup>

*D. Proposed Mechanism for a Long-Term Solution: UN Convention for Manned Spaceflight*

Other scholars suggest that States should pursue a new UN convention to address all issues implicated by commercial spaceflight.<sup>331</sup> This would be “open to worldwide ratification and would ensure uniform law exists in [the] ratifying states.”<sup>332</sup> One significant drawback to this approach is that a large number of States would have “vested interests in any such convention, which would mean the convention will contain some ambiguous provisions in order to facilitate compromise.”<sup>333</sup> In the end, this could mean that the existing interpretive ambiguities are resolved, but new ambiguities are created—perpetuating this legal issue for future generations.<sup>334</sup> This approach will take a significant amount of time to execute because of the need to obtain consensus among such a large number of States with different interests.<sup>335</sup> Admittedly, this convention may also be hindered by each State’s need to protect its own self-interest in creating a workable international framework.<sup>336</sup> These diverging agendas may culminate in

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326. AUST, *supra* note 133, at 241.

327. O’Brien, *supra* note 253, at 388.

328. *Id.*

329. *See id.* (explaining the advantages of a narrowed approach established by multilateral treaties).

330. *Id.* at 389.

331. *Id.* at 388.

332. *Id.*

333. *Id.*

334. *Id.*

335. *Id.*

336. Cf. Antonella Bini, *The Moon Agreement: Its Effectiveness in the 21st Century*, EUROPEAN SPACE POL’Y INST. PERSPECTIVES (Oct. 2008), available at [https://www.files.ethz.ch/isn/124689/espi\\_%20perspective\\_s\\_14.pdf](https://www.files.ethz.ch/isn/124689/espi_%20perspective_s_14.pdf) (on file with *The University of the Pacific Law Review*) (discussing the obstacles of a multitude of different perspectives on the enactment of the Moon Agreement, which largely serves as a cautionary tale in the space law arena).

a stalemate between space-faring and non-space-faring nations and lead to a convention that is deprived of much of its operative force.<sup>337</sup>

Despite those concerns, establishing a new international convention would allow for “equal standards among nations and function as a uniform source of law for the global community.”<sup>338</sup> A treaty exclusively regulating commercial manned spaceflight would help eliminate uncertainties and establish a comprehensive legal framework for this rapidly developing industry.<sup>339</sup> Some scholars posit that creating a convention such as this is an essential ingredient to the successful development of commercial space activities.<sup>340</sup> The content of this convention is beyond the scope of this Comment, yet would undoubtedly address the duty to rescue space tourists along with other emerging issues in this expanding industry.<sup>341</sup>

## VI. CONCLUSION

As mankind continues to trek into the future and takes larger steps away from Earth, “[s]pace vacations are becoming . . . business, like buying a ticket on an African safari.”<sup>342</sup> The industry will enjoy a steady flow of customers—which is an essential component to successful business operations—only if the public perceives these flights as safe.<sup>343</sup> Before commercial space travel can be readily available to members of the public, we must first ensure that the law protects *all* individuals on board a spaceflight, rather than just the pilot or employees hired to assist in some capacity during the voyage.<sup>344</sup> By removing the artificial distinction that the ambiguous language of existing antiquated treaties created, society will be able to truly reap the benefits of this groundbreaking industry.<sup>345</sup> If space tourists do not qualify as either “astronauts” or “personnel,” they will be exposed to unique dangers that compromise their physical safety and undermine their sense of security when embarking on what is already a dangerous voyage.<sup>346</sup> To help safeguard the lives of tomorrow’s space tourists and add certainty to an uncertain activity, it is critical to develop a well-defined and predictable legal

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337. DIEDERIKS-VERSCHOOR, *supra* note 74, at 46 (explaining the friction between the USSR and the U.S. when considering the Moon Agreement, which ultimately resulted in both countries refusing to ratify the treaty).

338. Easter, *supra* note 38, at 374.

339. Failat, *supra* note 11, at 151.

340. *Id.*

341. See generally Draft Convention, *supra* note 264 (setting forth a comprehensive model convention that covers many issues).

342. McFarland, *supra* note 165.

343. Sundahl, *supra* note 120, at 165.

344. Beck, *supra* note 15, at 37.

345. *Id.*

346. Freeland, *supra* note 11, at 10.

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framework.<sup>347</sup>

A formidable challenge remains to reconcile the law of the last century with the challenges and developments of today.<sup>348</sup> We cannot accomplish this by taking a “wait and see” approach; it instead requires “time and investment into space policy . . . to lay the foundation for the new era in international space law.”<sup>349</sup> Until States can agree on a new international convention that deals specifically with the novel challenges presented by commercial space tourism, implementing a uniform definition for space tourists and clarifying the language of these antiquated treaties through such mechanisms as UN resolutions, national legislation, and a new multilateral agreement are viable starting points.<sup>350</sup>

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347. Yun, *supra* note 25, at 961.

348. Krause, *supra* note 14.

349. Listner, *supra* note 312.

350. *See supra* Part V (exploring the different mechanisms through which change can be brought in this arena).