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In a Galaxy … Not so Far Away: The Privatization of Space Flight and the Need for Labor Laws in Outer Space

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INTRODUCTION

You finish a long week as a physician's assistant at St. Jude's hospital, the very hospital that saved your life from bone cancer when you were just ten years old.[1] You sacrificed and worked hard to get to this point, and suddenly, your life takes an unimaginable turn. A staffer at St. Jude's approaches you with, "a unique opportunity."[2] Your first instinct is that the hospital wants you to deliver a speech about your experiences as a child with such a life threatening disease, but, when you hear what the staff member has to say, you realize the opportunity is far greater than you can imagine.[3] This was Hayley Arceneaux's experience when presented with the opportunity to be the youngest American to fly to space.[4] After accepting the offer, Hayley became one of four civilians[5] to become a part of the first all-civilian mission to orbit.[6] This mission, also known as Inspiration4, was a human spaceflight mission that took place in 2021

1. *See generally, 29 Year Old Cancer Survivor to Launch on SpaceX Flight Promoting St. Jude Hospital*, CBS NEWS (Sept. 14, 2021), https://www.cbsnews.com/news/spacex-hayley-arceneaux-cancer-survivor-flight-promoting-st-jude-hospital/ (discussing the life and accomplishments of Hayley Arceneaux).

2. Jeffrey Kluger, *Meet the All-Civilian Crew of Inspiration4, From a St. Jude's Physician Assistant to a Lockheed Martin Engineer*, TIME (Aug. 10, 2021, 6:25 AM), https://time.com/6083979/meet-inspiration4-crew-members/.

3. *See id.*

4. *See 29 Year Old Cancer Survivor to Launch on SpaceX Flight Promoting St. Jude Hospital, supra* note 1.

5. Additional members of the crew aboard the SpaceX Crew Dragon capsule included commander and funder of the flight, Jared Isaacman, data engineer Chris Sembroski, and geoscientists and science communication specialist Sian Proctor. *See* Kluger, *supra* note 2.

6. *See 29 Year Old Cancer Survivor to Launch on SpaceX Flight Promoting St. Jude Hospital, supra* note 1.

operated by SpaceX[7] on behalf of Shift4 Payments CEO, Jared Isaacman.[8] The primary purpose of the mission was to raise awareness and funds funding for St. Jude's Children's Hospital and to "bring a new era for human spaceflight and exploration."[9] That is exactly what it did.[10] This new era of commercial space tourism opens the doors for several private companies to send employees and customers to space.[11]

Elon Musk and Jared Isaacman are not the only billionaires signaling in this new era of spaceflight; Virgin Galactic founder Richard Branson and Amazon founder Jeff Bezos have also entered the private space

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7. *See* SPACEX, https://www.spacex.com/mission/ (last visited Oct. 2, 2021). Space X is a private company owned by billionaire Elon Musk that took human beings to space in 2020. *See id.* SpaceX's family of Falcon launch vehicles are the first and only orbital class rockets capable of re-flight. *See id.* SpaceX believes that a fully functional and reusable rocket is the pivotal breakthrough needed to lower the cost of spaceflight. *See id.* While most rockets are designed to burn on re-entry to the earth's atmosphere, SpaceX's rockets can withstand reentry and successfully and safely land on Earth, enabling it to fly again. *See id.*

8. *See* Vicky Stein, *Inspiration4: The First All-Civilian Spaceflight on SpaceX Dragon,* SPACE (Sept. 23, 2021), https://www.space.com/inspiration4-spacex.html. Inspiration4 was the company's third crewed mission and the first one that did not send passengers to the International Space Station. Mike Brown, *Inspiration4: Incredible Video Shows Landmark Moment on SpaceX Crew Dragon*, INVERSE (Sept. 22, 2021) https://www.inverse.com/innovation/inspiration4-incredible-video. SpaceX built the Crew Dragon capsule as part of NASA's Commercial Crew program. *See id.* The crew did not fly to the international space station but instead stayed in a 360-degree glass dome, called the cupola. *See id.* NASA chose SpaceX and Boeing to create vehicles that could carry human beings and replace the international space station. *See id.* Inspiration4 was the company's third crewed mission, but the first non-NASA mission. *See id.*

9. Stein, *supra* note 8.

10. *See id.* These missions are just the start of what is to come, as SpaceX is currently developing the Starship, which is a fully reusable rocket that is designed to launch over 100 tons or 100 people to space at a time. *See also* Brown, *supra* note 8.

11. *See* Steve Gorman, *SpaceX Prepares to Send First All-Civilian Crew into Orbit,* REUTERS (Sept. 12, 2021, 9:53 PM), https://www.reuters.com/lifestyle/science/spacex-gets-ready-launch-first-all-civilian-crew-orbit-2021-09-12/. In December 2010, SpaceX was the first commercial entity to successfully launch and recover an object from Earth orbit, which only six nations have done in the fifty-five years that nations have been exploring space. Mathew Schaefer, *Analogues Between Space Law and Law of the Sea/International Maritime Law: Can Space Law Usefully Borrow or Adapt Rules from These Other Areas of Public International Law?,* PROC. INT'L INST. OF SPACE L., 316, 317 (2012). In May 2012, SpaceX completed a successful cargo run to the International Space Station (ISS); and NASA has increasingly begun relying on commercial companies to ultimately provide both cargo and crew carriage to the ISS since it retired their own Shuttles. *See id.* Virgin Galactic has collected well over 500 deposits seats on it suborbital flights, to both space tourists and those wishing to conduct zero-gravity research. *See id.* Communications and remote sensing have long been a part of the space environment, and has benefited people in their banking, agricultural sea traffic and air navigation, as well as telecommunications needs, and today the space market has become increasingly occupied by space entrepreneurs. *See id.*

industry.[12] Moreover, companies like Moon Express made headlines when it received the United States government's permission and tens of millions of dollars to begin lunar mining.[13] This new era in spaceflight is a historic moment for the world, opening access to space through vehicles not owned by the government.[14] In this new space age, the National Aeronautics and Space Administration (hereinafter "NASA") will be nothing more than a bystander as you buy your ticket to orbit.[15] NASA will not own or operate the rockets used to fly citizens to space, nor will they have a say in the selection or training process of the astronauts.[16] Morgan Stanley projects that the commercial space industry could become a trillion-dollar market over the next 20 years.[17]

While this new era may be the beginning of exploration far beyond what we could have imagined, it should be a cause for concern for regulators who believe the current space laws are not equipped to address the plethora of issues that arise when private actors send civilians to space.[18] Elon Musk himself recently suggested that his company would be able to make its own laws on a planned Mars colony.[19] There are a number of companies now looking to establish the world's first private space station, and with this comes the possibility of exploitation by monopolies.[20] Even

12. *See* Eric Kohn, *Billionaires Are Going to Space, but Hollywood Is Just Around the Corner*, INDIE WIRE (Jul. 30, 2021, 10:00 AM), https://www.indiewire.com/2021/07/hollywood-billionaires-going-to-space-1234654515/.

13. *See* Michael Tozzi, *Legislating the Final Frontier: Labour Laws and Transnational Jurisdiction in Space*, ST. ANDREWS L. REV. (May 11, 2021), https://www.standrewslawreview.com/post/legislating-the-final-frontier-labour-laws-and-transnational-jurisdiction-in-space. Rare earth metals that are critical to computing systems and Helium-3, which is a rare isotope that could serve as a potential clean energy source can be found on the moon. *See id.* With the United States' permission, the company hopes to mine those materials and revolutionize the industry. *Id.*

14. *See* Matt Weinzierl & Mehak Sarang, *The Commercial Space Age Is Here*, HARVARD BUS. REV. (Feb. 12, 2021), https://hbr.org/2021/02/the-commercial-space-age-is-here.

15. *See* Christian Davenport, *As Private Companies Erode Government's Hold on Space Travel, NASA Looks to Open a New Frontier*, WASH. POST (Feb. 25, 2021), https://www.washingtonpost.com/technology/2021/02/25/nasa-space-future-private/.

16. *See id.*

17. *See* Tozzi, *supra* note 13.

18. *See* Peter Ward, *The Unintended Consequences of Privatizing Space*, SCIENCE FOCUS (Nov. 6, 2019, 7:46 PM), https://www.sciencefocus.com/space/the-unintended-consequences-of-privatising-space/; *See also* Tozzi, *supra* note 13 ("However, even short of far-fetched scenarios like a Martian declaration of independence, there are many causes for concern about human rights in space at the nexus of agendas of multinational corporations and state actors.").

19. *See* Antonio Salmeri, *No, Mars is Not a Free Planet, No Matter What SpaceX Says*, SPACENEWS (Dec. 5, 2020), https://spacenews.com/op-ed-no-mars-is-not-a-free-planet-no-matter-what-spacex-says/.

20. *See* Ward, *supra* note 18.

more frightening is a scenario where a colony on Mars or the Moon is run entirely by a private corporation.[21] A single company could control everything a colonist needs to survive, a very dangerous scenario, as we enter into this new era of space flight.[22] Also among these issues comes questions about workers' and astronauts' rights in space—how would freedom of expression work for a mistreated worker aboard a private space station where a company supplies air and life support?[23] What rights do astronauts and private citizens have aboard private companies' space crafts?[24] How do we define private civilians flying to space for private companies?[25]

The main document standing between major corporations landing on the Moon and setting up a colony in space is The Outer Space Treaty, signed in 1967 by all of the major space-faring nations.[26] The treaty has been the foundation of space flight for over 50 years. However, it is flawed.[27] First, when it was written, the private space sector didn't exist, so it is unclear how these rules and regulations apply to private companies.[28] And second, the document is ridden with loopholes that are bound to be taken advantage of by powerful corporations.[29]

This note will focus on one major area of concern for regulators: the lack of labor laws and regulation on employers and large companies who will send civilians and employees to space.[30] The commercialization of space flight is a reality that is happening right in front of us, and now is the time to take the necessary steps to prevent complications and monopolization.[31] This note will further discuss the gap that exists in the current outer space laws that leaves astronauts and employees unprotected against private employers in space.[32] Section II of this note provides background information about the international and national laws currently in place for outer space and some of the labor disputes that have already happened

21. *See id.*
22. *See id.*
23. *See* Miriam Kramer & Bryan Walsh, *The Push to Define Workers' Rights in Space*, AXIOS (Apr. 13, 2021), https://www.axios.com/workers-rights-space-private-companies-4c5605e1-ddd8-480f-a60d-793f2343cb79.html.
24. *See id.*
25. *See* Davenport, *supra* note 15.
26. *See* Ward, *supra* note 18.
27. *See id.*
28. *See id.*
29. *See id.*
30. *See infra* Section II.c.
31. *See* Ward, *supra* note 18.
32. *See infra* Section III.a.

under existing space law.[33] Section III of this note discusses those gaps in greater detail and examines specific Articles in the Outer Space Treaty that private companies may argue do not pertain to their activities in space.[34] It will also discuss potential problems that can arise in space between employers and employees and components of labor laws that are missing entirely from the regulations currently in place.[35] Section IV of this note proposes a new definition for the term astronauts, the implementation of an independent arbitration commission to handle labor disputes, and amendments to the Outer Space Treaty that will explicitly address private entities and how to regulate them.[36] Finally, Section V will conclude with a discussion on the importance for more stringent standards on private entities and the immediate need for legislators to recognize that the era of commercial space flight and space tourism is here.[37]

I. BACKGROUND

A. *History of Space Flight and the Development of International and National Space Law*

Private spaceflight is not a new concept.[38] From the beginnings of space flight in the United States, NASA has relied on private contractors to build spacecraft machinery for every human spaceflight program.[39] However, the private sector's involvement was limited to the role of manufacturer in the service of public entities like NASA.[40] As a result of this, the five United Nations' space treaties[41] that were created in the 1960s

33. *See infra* Section II.

34. *See infra* Section III.

35. *See infra* Section III.

36. *See infra* Section IV.

37. *See infra* Section V.

38. *See* Nadia Drake, *The Future of Spaceflight—from Orbital Vacations to Humans on Mars*, NAT'L. GEOGRAPHIC, https://www.nationalgeographic.com/science/article/future-spaceflight (last visited Oct. 2, 2021).

39. *See id.*

40. *See* Frans G. von der Dunk, *Space Tourism, Private Spaceflight and the Law: Key Aspects*, 60 SPACE, CYBER & TELECOMM. L. PROGRAM FAC. PUBL'N 146, 146 (2011).

41. (1) the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (hereinafter Outer Space Treaty), (2) the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (hereinafter Rescue Agreement) (3) the Convention on International Liability for Damage Caused by Space Objects (hereinafter Liability Convention (4) the Convention on Registration of Objects Launched into Outer Space (hereinafter Registration Convention) and (5) the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies. *See* John

and 1970s focused on general provisions that regulated the relationship between countries in outer space, rather than individual actors.[42] This changing dynamic of space flight—from being controlled by government programs to being driven by the interests of private companies—is posing a challenge for regulators who are questioning whether the Outer Space Treaty has become obsolete.[43] Space law is epitomized by Article VI of the Outer Space Treaty, which establishes state responsibility for private activities the same way that it does for state activities.[44] However, this imposes the need for relevant states to create plans to regulate, authorize, and monitor private spaceflight.[45] For example, several states such as Singapore and the United Arab Emirates, have no comprehensive national space laws or regulations in place.[46]

Space law can be defined as the body of law that governs all space-related activities.[47] The world entered the beginnings of the space age on October 4, 1957, when the Soviet Union placed its first artificial satellite, Sputnik 1 in Earth's orbit.[48] Less than a year later, the United States Congress passed the National Aeronautics and Space Act creating NASA.[49] This event was a wake-up call to the international legal community, leading the United States Nations General Assembly to establish the United Nations Committee on the Peaceful Uses of Outer Space (hereinafter "UNCOPUOS") as an ad hoc committee (establishing it as a permanent committee the following year).[50] UNCOPUOS has two subcommittees, the Scientific and Technical Subcommittee, and the Legal Subcommittee, which are made up of experts in those fields who negotiate most of the multilateral space agreements.[51] There are five treaties that deal with

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Adolph, *The Recent Boom in Private Space Development and the Necessity of an International Framework Embracing Private Property Rights to Encourage Investment*, 40 THE INT'L LAW. 961, 965 (2006).

42. *See* von der Dunk, *supra* note 40, at 148.

43. *See* Catherine Doldirina, *Outer Space Laws and Legislation: Regulating the Province of all Mankind*, INST. OF ENG'G & TECH. (Jan. 22, 2018), https://eandt.theiet.org/content/articles/2018/01/outer-space-laws-and-legislation-regulating-the-provi.

44. *See infra* Section III.a.1.

45. *See* von der Dunk, *supra* note 40, at 148.

46. *See id.*

47. *See Space Law*, U.N. OFF. FOR OUTER SPACE AFF.'S, https://www.unoosa.org/oosa/en/ourwork/spacelaw/index.html (last visited Oct. 8, 2021).

48. *See* Brian Wessel, *The Rule of Law in Outer Space: The Effects of Treaties and Nonbinding Agreements on International Space Law*, 35 HASTINGS INT'L & COMP. L. REV. 289, 290 (2012).

49. *See id.* at 291.

50. *See id.*

51. *See id.*

general issues regarding the use of outer space by separate nations.[52] Each treatise emphasizes the notion of international cooperation and the well-being of all countries.[53] International space agreements can be divided into three periods: binding space treaties, nonbinding agreements to develop specific areas of space law, and nonbinding agreements negotiated in UNCOPUOS that focus on technical areas of space law.[54]

i. The Basic Structure of International Space Laws: The Outer Space Treaty

The laws currently in place regarding outer space include general international laws comprised of a variety of agreements, treaties, conventions, United Nations General Assembly resolutions, and rules and regulations of international organizations.[55] The laws address a variety of matters, such as preserving the space environment, liability for damages caused by space objects, the settlement of disputes, procedures for rescuing astronauts, international cooperation among different countries, and the sharing of information about potential dangers in space.[56] There are five main treaties that have been finalized through the United Nations Committee on the Peaceful Uses of Outer Space,[57] however, the most expansive and relevant piece of space law is the "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies" (hereinafter "the Outer Space Treaty").[58] There are one hundred and seven countries that are a party to the 1967 Outer Space Treaty, also known as the constitution of international space law.[59] The treaty is also hailed as the "Magna Carta" of space law.[60] It declares outer space as the "province of mankind."[61] In

52. *See Space Law Treaties and Principles*, U.N. OFF. FOR OUTER SPACE AFFS., https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html (last visited Oct. 8, 2021).

53. *See id.*

54. *See* Wessel, *supra* note 48, at 292.

55. *See* Space Law Treaties and Principles, *supra* note 52.

56. *See id.*

57. *See* Steven Freeland, *Up Up and...Back: The Emergence of Space Tourism and Its Impact on the International Laws of Outer Space*, 6 CHI. J. INT'L L. 1, 4 (2005).

58. *See* Loren Grush, *How an International Treaty Signed 50 Years Ago Became the Backbone for Space Law*, VERGE (Jan. 27, 2017), https://www.theverge.com/2017/1/27/14398492/outer-space-treaty-50-anniversary-exploration-guidelines.

59. *See* Doldirina, *supra* note 43.

60. *See* Skip Smith, *A Space Law Primer for Colorado Lawyers Part 1: International Space Law*, COLO. LAW., 49, 50 (Mar. 2018).

61. Doldirina, *supra* note 43.

doing so, it ensures that exploration and use of space shall benefit all countries that are a part of the treaty and ensures free access to planets and other celestial bodies.[62] The primary purpose of the treaty is to facilitate and promote "international co-operation in the peaceful exploration and use of outer space."[63]

Each of the articles emphasize international cooperation with regards to research, exploration, and scientific endeavors.[64] The general theme of the Outer Space Treaty is that no one country should interfere with the activities of another.[65] Article I establishes that the exploration and use of outer space shall be conducted "for the benefit and in the interests of all countries."[66] This "common interest" principle is vague and imposes no specific requirement or procedure for sharing of benefits.[67] Article I also establishes the principle of the freedom of exploration and use of outer space.[68] This principle is similar to that of the high seas,[69] as the freedom of use of outer space must be exercised with regard to the interests of other states.[70] This provision is critical to the creation of an environment that allows space activity to flourish amongst varying nations.[71] Article II establishes that outer space is "not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."[72] This clause furthers the freedom of use principle in Article I.[73] Moreover, Article III extends the U.N. Charter and international law in general to space.[74]

Article III allows gaps to be filled by principles of customary international law and other international law principles like self-defense and armed conflict.[75] Yet, while Article III is paramount to the application of

62. *See id.*

63. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410; 610 U.N.T.S. 205; 6 I.L.M. 386 [hereinafter Outer Space Treaty].

64. *See generally id.* (including all the articles agreed upon by the United Nations).

65. *See id.*

66. Smith, *supra* note 60, at 50.

67. *See id.* at 51.

68. *See id.*

69. *See generally* IAN BROWNLIE, *PRINCIPLES OF PUBLIC INTERNATIONAL LAW* 238-40 (Oxford University Press 1979) (discussing how states are required to cooperate with regard to sea-based piracy issues in different jurisdictions); *see also infra* Section IV.

70. *See* Smith, *supra* note 60, at 51.

71. *See id.*

72. Outer Space Treaty, *supra* note 63, at art. II.

73. *See* Smith, *supra* note 60, at 51.

74. *See id.*

75. *See id.*

international law in outer space, it has also caused discrepancy between the law of outer space and international law because the principles of laws are different.[76] Article III states that International law is applicable in exploration of outer space, however, it does not limit international law in the exploration of outer space.[77] While this note focuses specifically on labor law principles, Section III will briefly discuss this issue further.[78] Article IV addresses the arms control issues in space, and Article V defines astronauts as the "envoys of mankind," requiring all parties to the Treaty to assist astronauts in distress.[79] Article VI is particularly important for purposes of this note, as interested parties believe this Article forms the basis for which non-governmental entities like individuals and private companies can conduct space activities.[80] Article VI states:

> States Parties to the Treaty shall bear international responsibility for national activities in outer space. . . whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space. . . shall require authorization and continuing supervision by the appropriate State Party to the Treaty.[81]

Article VII reinforces the provisions in Article VI, and Article VIII ensures that parties retain jurisdiction, ownership, and control of their registered space objects.[82] Articles IX, X, and XI discuss the importance of cooperation and focus on the conduct of activities in space, such as preserving the environment, avoiding harmful contamination, and refraining from experiments that could cause harm to the activities of other parties.[83] Finally, Article XII states that advanced notice must be given to all other nations when a nation enters space or sends objects to space to assure safety and avoid interference with other nations.[84]

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76. *See* Hoe, L.I., et al., *Article III of the 1967 Outer Space Treaty: A Critical Analysis*, 8(5) INT'L J. ACAD. RSCH. BUS. & SOC. SCI., 326, 328 (2018).

77. *See id.*

78. *See infra* Section III.

79. *See* Outer Space Treaty, *supra* note 63, at art. V, VI.

80. *See id.* at art. VI.

81. *Id.* While the Outer Space treaty was being negotiated, the Soviet Union wanted only nations to conduct space activities, so the drafters compromised and included this provision to ensure that each nation remains responsible for all of the non-governmental entities and must continue to provide authorization and supervise them. *See also* Smith, *supra* note 60, at 51.

82. *See* Outer Space Treaty, *supra* note 63, at art. VII, VIII.

83. *See id.* at art. IX, X, XI.

84. *See id.* at art. XII.

The first step in amending and filling in the gaps that the Outer Space Treaty has is to understand the Articles mentioned above.[85] Regulators need to understand what the Outer Space Treaty contains in order to create new laws that conform to its general principles.[86] While the Outer Space Treaty has been the foundation for space activities for over 50 years, its broad principles are often subject to varying interpretations.[87] As we enter the age of space privatization, the Treaty's broad, general principles should be looked at now more than ever.[88]

ii. NASA and the Basic Structure of Space Law in the United States

The United States' first codified space law with the creation of the National Aeronautics and Space Act of 1958 (hereinafter "NASA Act").[89] The NASA Act created a civilian space program (hereinafter "NASA") and assigned any military space activities to the Department of Defense (hereinafter "DOD").[90] After the creation of NASA, the economic and technological benefits of using private companies for United States space activity became clear.[91] In 1984, Congress codified the Commercial

85. *See supra* Section II.a1.

86. *See* Smith, *supra* note 60, at 52.

87. *See id.*

88. *See id.*; *infra* Section III-a.1. The Rescue Agreement of 1968 is another document that is meant to be read in conjunction with the Outer Space Treaty. *See* Adolph, *supra* note 41, at 965. The Rescue Agreement establishes a system of protocols if an emergency happens that injures any space personnel while they are in space, or if another nation's space object lands in another state's jurisdiction. *See id.* The agreement states that the entire world should immediately notified of the emergency and that all states are a party to the Outer Space Treaty should render immediate assistance. *See id.*

89. *See Space Law,* https://spacepolicyonline.com/topics/space-law/# (last visited Oct. 11, 2021); Nautical Aeronautics and Space Act of 1958, Pub. L. No. 85-568, 72 Stat. 426 (codified in scattered sections of 5 U.S.C., 10 U.S.C., 18 U.S.C., 42 U.S.C., 50 U.S.C.), *amended by* NASA Authorization Act, 42 U.S.C. § 2451 (1990).

90. *See* Nautical Aeronautics and Space Act of 1958, Pub. L. No. 85-568, 72 Stat. 426. The Act also created a council which is comprised of the President (who presides over meetings of the Council), the Secretary of State, the Secretary of Defense, the Administrator of the National Aeronautics and Space Administration, and the Charmain of the Atomic Energy Commission. *See* § 201(a), 72 Stat. at 427-28. Some of the council's duties include presiding over all significant aeronautical and space activities, including the policies and programs, and facilitating cooperation between the National Aeronautics and Space Administration and the Department of Defense. *See* § 201(e)(1)- § 201(e)(4) 72 Stat. at 428.

91. *See* Sarah Knarzer, Annotation, *The (Regulatory) Force is With You: Using Early Aviation to Anticipate the Black Holes in the FAA's Proposed Regulatory Changes for Commercial Human Space Flight*, 5 ADMIN. L. REV. ACCORD 205, 212 (2020).

Space Launch Act (hereinafter "CSLA").[92] The CSLA requires that all launches be licensed by the U.S. Federal Aviation Administration (hereinafter "FAA"), including those for human space flight, pursuant to the liability that international law could impose.[93]

The CSLA enabled the FAA to oversee launches and space flight activity and assigned the FAA the responsibility of issuing commercial licenses and granting permits in an expedited way to encourage and promote new developments in space technology.[94] The FAA currently presides over and regulates private companies, which compete for government contracts to provide the transportation of people and supplies to the International Space Station.[95] All commercial companies that get a license from the FAA must comply with the CSLA.[96]

Article VI of the Outer Space Treaty arguably vests the States with the obligation to monitor and control the activities of private entities in outer space.[97] States accomplish this through domestic laws such as licensing regulatory oversight.[98] The United States uses various licensing and regulatory regimes.[99] The Communications Act of 1934, passed long before the first spaceflight, has been amended over time to govern requirements for commercial satellite operations, licensing, coordination in the use of the radio spectrum, and the orbital slots allocated to the U.S. by the International Telecommunications Union (hereinafter "ITU").[100] Other agencies regulating U.S. national space activity are the Department of

92. *See* 51 U.S.C. §§ 50901-23 (1984), *amended by* the Commercial Space Launch Amendments Act, 49 U.S.C. §§ 70101-05 (2004).

93. *See* Commercial Space Launch Act, Pub. L. No. 98-575, § 6, 98 Stat. 3055, 3057 (1984).

94. *See* Knarzer, *supra* note 91, at 216.

95. *See id.* at 217.

96. 14 C.F.R. § 460 (2019). Crew members are required to have extensive training for emergency scenarios. *Id.* Operators are responsible for this training, as well as maintaining records, obtaining informed consent, and ensuring the vehicle's atmospheric conditions, safety measures, and risk detection features. *Id.*

97. *See infra* Section III.a.1; *see also* John Goehring, *Properly Speaking, the United States Does have an International Obligation to Authorize and Supervise Commercial Space Activity*, 78 A. F. L. REV. 101, 105 (2018).

98. *See* Paul S. Dempsey, National Laws Governing Commercial Space Activities: Legislation, Regulation, & Enforcement, 36 NW. J. INT'L L. & BUS. 1, 13 (2016) ("The space treaties also explicitly obligate the States to regulate and supervise national activities in space....").

99. *See id.*

100. *See* Communications Act of 1934, 47 U.S.C. § 151 (2012). The ITU is a UN body that regulates frequencies and orbital slots in geosynchronous orbit. A geosynchronous orbit is a high Earth orbit that allows satellites to match Earth's rotation. This position is a valuable spot for monitoring weather, communications and surveillance. *See also* Elizabeth Howell, *What is a Geosynchronous Orbit?* SPACE.COM (Apr. 24, 2015), https://www.space.com/29222-geosynchronous-orbit.html.

Transportation (hereinafter "DOT"), and the Department of Commerce, through the National Oceanic and Atmospheric Agency (hereinafter "NOAA").[101] The NOAA regulates the licensing, monitoring, and compliance of private remote-sensing satellites pursuant to the Land Remote Sensing Policy Act of 1992.[102] These domestic regulations serve a variety of purposes and encourage expansion and development within the space sector while decreasing the risks involved in space travel.[103] While these domestic rules must be followed, the States must also be cautious that they fulfill their overall obligations under the Outer Space Treaty.[104] Thus, the regulations for Space in the United States, and many other countries, are twofold.[105]

iii. The Legal Status of Astronauts

The legal status of astronauts varies among different countries.[106] Merriam-Webster defines an astronaut as, "a person who travels beyond the earth's atmosphere; a trainee for spaceflight."[107] Article V of the Outer Space Treaty, which applies to all spacefaring nations, classifies astronauts as a protected group that are considered "emissaries of humanity with rights and protections."[108] This provision sets forth a few different elements for astronaut classification.[109] The first element is an ethical one, which sets forth the notion that astronauts are envoys of mankind in outer space.[110] This emulates the idea that outer space astronauts are representatives of humanity.[111] Astronauts must be helped, rescued, or assisted, regardless of their international situation, nationality, or origin.[112] Astronauts also have a duty to assist other astronauts, as well as an

101. *See* Dempsey, *supra* note 98, at 25–27.

102. *See* Land Remote Sensing Policy Act of 1992, Pub. L. No. 102-555, 106 Stat. 4163.

103. *See* Goehring, *supra* note 97, at 106.

104. *See id.*

105. *See id.*

106. *See* Yuri Baturin, *The Astronaut's Legal Status, in* 5 ADVANCED SPACE L., 4,5 (Valentyn Halunko ed., 2020).

107. *Astronaut*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/astronaut (last visited Nov. 11, 2021).

108. Kramer & Walsh, *supra* note 23.

109. Louis de Gouyon Matignon, *The Legal Status of Astronauts,* SPACE LEGAL ISSUES, (Jan. 26, 2019), https://www.spacelegalissues.com/space-law-the-legal-status-of-astronauts/.

110. *See id.*

111. *See id.*

112. *See id.*

international duty of supervision by observation.[113] This duty requires individuals to immediately inform the other states parties to the treaty of any phenomena they discover in outer space, including the Moon and other celestial bodies, which could pose a threat to the health or the life of other astronauts.[114] The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space elaborated on elements of Article V of the Outer Space Treaty and provides that States must take all possible steps to rescue and assist astronauts in distress and return them to the launching State. [115]

In the United States, three agencies can designate people as astronauts: NASA, the FAA and the United States Military.[116] NASA employs civilian astronauts and military astronauts.[117] Once employed, civilian astronauts are expected to remain with NASA for at least five years and during this time they are considered employees of the federal government.[118] Federal government employee advancement is based on a system of occupational pay levels, or "grades."[119] A general schedule is what determines the salaries for 15 grades.[120] Most federal civil service workers start at the lowest grade for an occupation and through a series of promotions reach the full performance grade for that occupation.[121] The civilian astronaut pay grades are GS-11 through GS-14, based on achievements and experience.[122] Civilian astronauts can choose from different healthcare plans and life insurance policies and the premium payments for these policies are usually offset by the federal government.[123] Astronauts that were hired after January 1, 1984 participate in the Federal

113. *See id.*

114. *See id.*

115. Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968, 19 U.S.T. 7570, 672 U.N.T.S. 119 [hereinafter Astronaut Agreement].

116. *See* Denise Chow, *Who Gets to be Called an Astronaut? It's Complicated*, NBC NEWS, (July 23, 2021, 3:22 PM EDT), https://www.nbcnews.com/science/space/gets-called-astronaut-complicated-rcna1499.

117. *See generally* NASA, https://www.nasa.gov/astronauts (last visited Nov. 13, 2021) (listing all of the active astronauts and astronaut candidates).

118. *See* William Harris & Nathan Chandler, *How Astronauts Work: Astronaut Compensation and Benefits*, HOW STUFF WORKS, https://science.howstuffworks.com/astronaut8.htm (last visited Nov. 13, 2021).

119. *See id.*

120. *See id.*

121. *See id.*

122. *See id.*

123. *See id.*

Employees Retirement System (hereinafter "FERS").[124] By contrast, military astronauts are hired by NASA for a specified mission and they remain in active duty and receive their military pay, benefits, and leave.[125]

This may seem straight forward, but problems arise when it comes to an astronaut's status on commercial space flights.[126] Are space tourists merely traveling on a private companies' spacecraft really "envoys of mankind?"[127] The FAA does not seem to think so.[128] On July 20, 2021, an FAA policy order went into effect defining three main eligibility requirements for astronaut status; (1) commercial launch crew members must be employed by an FAA-certified company performing the launch, (2) they must reach an altitude higher than 50 miles above the surface of the Earth during flight, and (3) they must demonstrate that activities performed during the mission were "essential to public safety, or contributed to human space flight safety."[129] Under these rules, according to the FAA, space tourists who take a joyride aboard a billionaire's space craft are ineligible for astronaut status.[130] The question becomes, however, what counts as "essential activities" for public safety or human spaceflight?[131] This standard is also at the FAA's discretion.[132]

Even with this new policy order, it is difficult to assess the legal status of these astronauts aboard certain spacecrafts.[133] While Jeff Bezos' Blue Origin flight may be clear cut, Richard Branson's Virgin Galactic flight is more complicated.[134] In Bezos' case, the passengers did not have

124. *See id.* FERS is a three-tiered retirement program that includes Social Security, a pension plan, and an optional Thrift Savings Plan. *See id.*

125. *See id.*

126. *See generally* Leah Crane, *Who Counts as an Astronaut? Not Jeff Bezos, Say New US Rules*, NEWSCIENTIST (July 22, 2021), https://www.newscientist.com/article/2285017-who-counts-as-an-astronaut-not-jeff-bezos-say-new-us-rules/ (addressing who the FAA will define as an astronaut in the new commercial space age).

127. *See* de Gouyon Matignon, *supra* note 109.

128. *See* Crane, *supra* note 126.

129. FAA Commercial Space Astronaut Wings Program, FAA Order No. 8800.2, (July 2020); Chow, *supra* note 116.

130. *See* Chow, *supra* note 116.

131. *See id.*

132. *See id.*

133. *See id.*

134. *See* Crane, *supra* note 126. It was a monumental day for the future of the space tourism industry. The spacecraft branded "New Shepard" was manned by Bezos (57), his brother Mark (53), aviation pioneer Wally Funk (82), and Dutch physics student Oliver Daeman (18). *See* Mike Wall, *Jeff Bezos Launches Into Space on Blue Origin's 1st Astronaut Flight*, SPACE.COM (July 20, 2021) https://www.space.com/jeff-bezos-blue-origin-first-astronaut-launch. The spacecraft flew 66.5 miles above earth and landed safely in just 10 full minutes. *See id.* On July 11, just two weeks earlier,

to control the spacecraft because it was entirely controlled from the ground.[135] Branson, however, designated his flight as a test flight, which could satisfy the FAA's requirement that the crew members perform some type of tasks that contribute to the safety of human spaceflight.[136] In the case of SpaceX's Inspiration4 flight, the FAA has already stated that "SpaceX has designated all four individuals traveling on Inspiration4 as spaceflight participants, not crew."[137] Thus, under the criteria that the FAA has set forth regarding who is eligible to receive astronaut wings, the SpaceX crew does not qualify.[138]

Entrepreneurs like Elon Musk, Jeff Bezos, and Richard Branson are not done yet.[139] The coming years will see a rapid expansion of the private sector into this multi-billion-dollar industry.[140] The question thus becomes: how do we apply the laws in place (the Outer Space Treaty and the Astronaut Agreement) to private individuals working for private companies who are not classified as astronauts at all?[141]

Virgin Galactic founder Richard Branson flew on the first fully crewed flight aboard the VSS Unity space plane. *See id.*

135. *See* Crane, *supra* note 126.

136. *See* Chow, *supra* note 116. There are exceptions to the FAA's regulations; the agency can give honorary wings to "individuals who demonstrated extraordinary contribution or beneficial service to the commercial human space flight industry." Crane, *supra* note 126.

137. Brown, *supra* note 8; *see* Mike Brown, *Why Inspiration4's Participants Aren't Actual Astronauts*, INVERSE (Sept. 17, 2021) https://www.inverse.com/innovation/inspiration4-are-they-astronauts. The FAA defines the crew as,

> [A]ny employee or independent contractor of a licensee, transferee, or permittee, or of a contractor or subcontractor of a licensee, transferee, or permittee, who performs activities in the course of that employment or contract directly relating to the launch, reentry, or other operation of or in a launch vehicle or reentry vehicle that carries human beings. A crew consists of flight crew and any remote operator.

14 CFR § 401.5. A spaceflight participant is, "an individual who is not crew, carried aboard a launch vehicle or reentry vehicle." 14 CFR § 401.5.

138. *See* Brown, *supra* note 8.

139. *See id.* ("But SpaceX is already testing the vehicle that could replace the Crew Dragon. The Starship, the under-development rocket, aims to launch up to 100 people or 100 tons into space at a time."); *see also* Mike Wall, *supra* note 134 ("So this isn't a competition. This is about building a road to space so that future generations can do incredible things in space.").

140. *See* Wall, *supra* note 134.

141. *See generally* Brianna Rauenzahn et al., *Regulating Commercial Space Activity*, The Regulatory Review (June 6, 2020), https://www.theregreview.org/2020/06/06/saturday-seminar-regulating-commercial-space-activity/ (explaining the transformation of space flight from a public endeavor to a private one and what problems regulators will face as space tourism begins to expand).

iv. The International Space Station

The only permanent structure currently in space is the International Space Station (hereinafter "ISS").[142] The ISS is a multinational governmental project that is not owned by one single nation and 258 individuals from 20 countries have visited as of May 2022.[143] Astronauts travel to the space station via a Russian Soyuz capsule, which is the only spacecraft that brings people to the ISS since NASA shut down its space shuttle program in 2011.[144] However, on March 3, 2020, Elon Musk's SpaceX Crew Dragon began flying people "starting with the Demo-2 mission that launched on May 30, 2022."[145] Typically, once astronauts arrive at the station they spend 6 months conducting various experiments and repairing the ISS.[146] The International Space Station Intergovernmental Agreement (hereinafter "ISS Agreement") establishes the ISS as an international endeavor, and emphasizes the principles set forth in the Outer Space Treaty, building on the importance of cooperation and partnership in outer space.[147]

Articles 5 and 6 of the International Space Station Agreement state that each nation participating in the ISS shall own the equipment it provides and, "shall retain jurisdiction and control over the elements it registers... and over personnel in or on the Space Station who are its nationals."[148] Moreover, Article 21 states that any discoveries and work production occurring on an element of the ISS shall be considered to have occurred in the territory of the element's registering nation.[149] Therefore, each part of the ISS is a piece of the nation's registering element.[150] For

142. *See* Adolph, *supra* note 41, at 965.

143. *See* Elizabeth Howell, *International Space Station – Everything You Need to Know*, SPACE.COM (last updated Apr. 28, 2023) https://www.space.com/16748-international-space-station.html.

144. *See id.*

145. *Id.*

146. *See id.* In addition to the various work that astronauts do, they spend at least 2 hours on exercise and personal care. *See id.* They occasionally perform spacewalks, conduct media events and post updates to social media. *See id.* In May 2009, Mike Massimino became the first astronaut to tweet from space. *See id.*

147. *See* Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station (pmbl.), Jan. 29, 1998, State Dep't No. 01-52, 2001 WL 679938 T.I.A.S. 12927 [hereinafter International Space Station Agreement].

148. *Id.* arts. 5, 6.

149. *See id.* art. 21.

150. *See id.* art. 21.

example, Russian laws apply in the Russian modules, the United States has jurisdiction of its pieces and, depending on where an individual is located, different laws will apply.[151]

B. *The Skylab Strike*

History has alluded to the problems coming in the next few decades for participating countries.[152] Although space travel grew since the United States first endeavored to outer space, by the 1970s, the Apollo program[153] began to wind down, and with the cancellation of the Apollo missions 18, 19 and 20, NASA created the Apollo Applications Program (hereinafter "AAP").[154] This program allowed NASA to convert remaining rockets to create the Skylab space station.[155] The space station could be occupied by three astronauts at a time and was launched into space unmanned on May 14, 1973.[156] Skylab 4 was the final mission aboard Skylab and was crewed by Commander Gerald Carr, Science Pilot Edward Gibson and Pilot William Pogue.[157] The crew spent a then record-breaking eighty-four days in continuous orbit.[158] However, this record-breaking time in orbit is not the only thing worth noting about this mission; as this was also the first time a so-called "mutiny" took place in space.[159]

There are conflicting sources about the "Skylab strike", and it is still unclear whether this event was a miscommunication aboard Skylab 4 or whether there was a true strike in space.[160] The ambiguities exist in the

151. *See* Adolph, *supra* note 41, at 965.

152. *See generally* Doug Adler, *Was There Really a "Mutiny" Aboard the Skylab Space Station?,* ASTRONOMY (June 12, 2020), https://astronomy.com/news/2020/06/was-there-really-a-mutiny-aboard-the-skylab-space-station (discussing the 1973 "Skylab 4" mission, during which a labor issue and possible strike arose due to the rookie astronauts' frustration with their hyper-demanding work schedules).

153. *See generally The Apollo Missions,* NASA, https://www.nasa.gov/mission_pages/apollo/missions/index.html (last visited Oct. 11, 2021) (giving an overview of all of the Apollo Missions).

154. *See id.*

155. *See id.*

156. *See id.*

157. *See id.*

158. *See id.*

159. *See id.*

160. *Compare* Henry S.F. Cooper, *A Reporter At Large: Life in a Space Station,* NEW YORKER 34, 40 (Aug. 22, 1976), https://www.newyorker.com/magazine/1976/08/30/life-in-a-space-station-i, *with* Kelli Mars, *The Real Story of the Skylab 4 "Strike" in Space*, NAT'L AERONAUTICS

extent to which these crew members went to get a break from their supervisors at NASA, and whether they really cut off all communication with them for an extended period of time.[161] Nevertheless, it has been confirmed that the astronauts aboard Skylab 4 did feel overworked during their time aboard the station.[162] The first mention of the alleged strike appeared more than two years after the end of the mission in a magazine article written by author Henry S.F. Cooper entitled, "Life in a Space Station."[163] Cooper wrote, "the third crew went on a sort of sit-down strike one day about halfway through the mission. That day, Carr, Gibson, and Pogue stopped working and did exactly what they felt like doing."[164] Cooper then published a book titled *A House in Space*, which expanded on the magazine article.[165] Sources vary on their recount of the events, but NASA has confirmed that there were workplace issues that needed to be addressed the first days aboard Skylab.[166]

By November 16, 1973, the mission managers had decided to extend the originally planned fifty-six day mission to eighty-four days.[167] This extension meant that researchers had to conduct new medical experiments to monitor the astronauts' health for longer periods of time.[168] This resulted in an increase of the astronauts' planned daily exercise by 50%, and the addition of an improvised treadmill to minimize bone loss and muscle deconditioning.[169] Normally, mission planners allow for the astronauts to have a period of adjustment to working in weightless conditions by not overscheduling their time in the first few weeks of the mission, but the mission planners did not allow for this period of adjustment on this mission.[170] The number of spacewalks the crew was required to do was doubled to four to observe a newly discovered comet, Kohoutek.[171]

AND SPACE ADMIN. (Nov. 16, 2020), https://www.nasa.gov/feature/the-real-story-of-the-skylab-4-strike-in-space.

161. *Compare* de Gouyon Matignon, *supra* note 109, *with* Mars, *supra* note 160 (rejecting the Skylab strike theory and explaining that there was a workplace dispute, but it was resolved before it became a strike).

162. *See* Mars, *supra* note 160.

163. *See* Cooper, *supra* note 160.

164. *Id.* at 45.

165. *See generally* HENRY S.F. COOPER JR., A HOUSE IN SPACE (1976) (describing the events that occurred aboard Skylab 4).

166. Mars, *supra* note 160.

167. *See id.*

168. *See id.*

169. *See id.*

170. *See id.*

171. *See* Kirstie Brewer, *Skylab: The Myth of the Mutiny in Space*, BRITISH BROAD. CORP. (Mar. 20, 2021), https://www.bbc.com/news/stories-56346001.

According to NASA, the extended mission and the strenuous schedules that the astronauts had to quickly adjust to aboard Skylab "led to some frustrations as the astronauts struggled to keep up with the blistering pace of the timeline, allowing no time for familiarization or to recover from errors and hardware malfunctions."[172] The crew repeatedly requested a lighter schedule from Mission Control, leading to mounting tension between the crew members and the ground crew.[173] Ed Gibson, the last surviving astronaut from the Skylab 4 mission recounted the events, stating:

> [A]nyone who has been micromanaged will know that it's bad enough for an hour—but try living like that 24 hours a day—having your day sketched out minute by minute, ... it wasn't constructive and we weren't getting things done because we couldn't use our own judgement.[174]

Mission Commander Jerry Carr, in speaking to NASA on the conditions that they were enduring on the mission stated, "[w]e would never work 16 hours a day for 84 straight days on the ground, and we should not be expected to do it here in space".[175]

Every contact between the ground and the crew consisted of a prolonged bombardment of questions and demands which led to the so-called "strike."[176] The crew decided that only one person needed to tune into the morning briefing and worked out a schedule for who would be listening.[177] However, as the astronauts grew more and more fatigued, the crew had a miscommunication and realized that no one was listening to the morning briefing coming from the ground.[178] The astronauts were out of communication for one whole orbit—about ninety minutes.[179] According to Ed, the grounds crew interpreted this as a strike, but it was simply a mistake.[180] The media took hold of the story and transformed it into their

172. Mars, *supra* note 160.

173. *See id.*

174. Brewer, *supra* note 171 (quoting Ed Gibson).

175. Michael Hiltzik, *Column: The Day When Three NASA Astronauts Staged a Strike in Space,* L.A. TIMES, (Dec. 28, 2015, 2:42 PM), https://www.latimes.com/business/hiltzik/la-fi-mh-that-day-three-nasa-astronauts-20151228-column.html (quoting Jerry Carr).

176. *See* Brewer, *supra* note 171.

177. *See id.*

178. *See id.* (quoting Ed Gibson).

179. *See id.* In these days, communication to the ground could only last about 10 minutes at a time, because they had to time the space station as it passed over ground control stations on earth. *Id.*

180. *See id.* (quoting Ed Gibson).

own.[181] Nevertheless, the crew did have a consultation with the mission crew about the scheduling process, where the crew expressed their concerns and needs for off-duty days every 10 days, allowing for time between different activities for the astronauts to clean up in between.[182] There were no further incidents reported aboard Skylab 4 and the crew completed their record setting eighty four day mission on February 8, 1974.[183]

Whether there was a true strike or mutiny aboard Skylab 4, the tensions that mounted between the crew and ground control were substantial and could have led to worse conflict given the dangers of space flight.[184] This incident raises several questions about how to deal with these conflicts, who will deal with them, and how to categorize "astronauts" in this era of "New Space", as private companies are sending everyday employees to outer space.[185]

C. *Current Labor and Employment Laws*

Similarly to various government entities in the United States, NASA must comply with the rules and regulations enforced by the U.S. Equal Employment Opportunity Commission (hereinafter "EEOC").[186] These laws include Title VII of the Civil Rights Act of 1964 (hereinafter "Title VII"), which makes it illegal to discriminate against someone based on race, color, religion, national origin, or sex.[187] The law also prevents retaliation against a person who has been discriminated against and filed a charge of discrimination against the employer.[188] Employers and employees at NASA are subject to further laws such as The Equal Pay Act of 1963, The Age Discrimination in Employment Act of 1967, Title I of the Americans with Disabilities Act of 1990, and The Genetic Information Nondiscrimination Act of 2008.[189] These laws have been implemented to

181. *See id.*

182. *See id.*

183. *See id.*

184. *See id.*

185. *See* de Gouyon Matignon, *supra* note 109 (discussing several different possible definitions of an astronaut).

186. *See Diversity and Equal Opportunity*, NASA, https://www.nasa.gov/offices/odeo/EEO-laws-regulations (last visited Jan. 23, 2022).

187. *See* 42 U.S.C. § 2000e-2 (1964).

188. *See* U.S. EQUAL EMP. OPPORTUNITY COMM'N, *Laws Enforced by EEOC*, https://www.eeoc.gov/statutes/laws-enforced-eeoc (last visited Jan. 23, 2022).

189. *See id.*; NASA, *supra* note 186.

protect workers' rights and prevent employers from taking advantage of their employees.[190] While NASA complies with these laws, it is unclear which laws these private companies will have to follow while they continue to send workers to space without NASA's supervision or any other regulating body.[191] Questions arise for example, when two international entities work together in space.[192] Which laws to follow if, in the process of working with a foreign nation, an employee in space feels that he or she is discriminated against by someone from a separate country? Further, while these laws are in place, billionaires like Jeff Bezos and Elon Musk are continuously thwarting them here on Earth, and very little stops them from carrying on these practices as they exit this atmosphere.[193]

The U.S. Department of Labor (hereinafter "DOL") administers and enforces more than 180 federal laws.[194] The Fair Labor Standards Act provides standards for wages and overtime pay, and the act is administered by the Wage and Hour Division.[195] The act requires employers to pay covered employees a federal minimum wage and overtime pay.[196] The Occupational Safety and Health Act (hereinafter "OSH"), is administered by the Occupational Safety and Health Administration (hereinafter. "OSHA") and controls the safety and health conditions of private industries.[197] All employers covered by this act must comply with OSHA's regulations for safety and health in the workplace and have a general duty under the OSH Act to provide their employees with safe workplace conditions.[198] There are many other labor laws that protect workers' rights in the United States, including the Employee Retirement Income Security Act (hereinafter "ERISA"), and the Family and Medical Leave Act (hereinafter "FMLA").[199] Each of these laws regulate safety and minimum standards of care for all employees across the United States.[200]

190. *See* U.S. EQUAL EMP. OPPORTUNITY COMM'N, *supra* note 188.

191. *See* Kramer & Walsh, *supra* note 23.

192. *See* U.S. EQUAL EMP. OPPORTUNITY COMM'N, *supra* note 188 (describing the laws enforced by the EEOC which only apply to United States astronauts).

193. *See* discussion *infra* Section III.b.

194. *See* U.S. DEP'T OF LAB., *Summary of the Major Laws of the Department of Labor*, https://www.dol.gov/general/aboutdol/majorlaws (last visited Jan. 25, 2022).

195. *See id.*

196. *See id.*

197. *See id.*

198. *See id.*

199. *See id.*

200. *See id.*

Unions are another critical aspect to employee's rights in the workplace.[201] The National Labor Relations Board (hereinafter "NLRB") is a federal agency that "safeguard[s] employees' rights to organize and to determine whether they should form unions to act as their bargaining representative."[202] While 53% of NASA's workforce is in a bargaining unit that is represented by a labor union, the private companies that are planning space flight missions are not.[203] In the context of the Skylab Strike, a social media influencer and private investigator tweeted, in response to an Los Angeles Times Article memorializing the anniversary of the Skylab Strike, "Movie idea: Astronauts unionize in space and then come back to fight the legislative battle to get unions made in outer space valid in Manitoba."[204]

III. ISSUE

The transformation of space flight from the public to the private sector "raises questions about how to regulate the activities of private entities in space."[205] NASA has begun to outsource the task of transporting individuals to space by granting billion dollar contracts to SpaceX and Boeing and has plans to rely on this commercial partnership in the future.[206] But private companies have their own goals for outer space; Elon Musk hopes to "start a human colony on Mars"; Jeff Bezos also "has his sights set on space colonization"; and large "firms such as Bigelow Aerospace and Axiom [have] plan[s] to develop their own space stations."[207]

Now that private firms have their sights set on expanding space exploration, to create businesses, or even societies in space, there is a need for "fundamental rights agreements [and laws] to guarantee laborers and employees aren't exploited."[208] There are some legal tools used on the ground, such as the US Foreign Corrupt Practices Act, which can be employed by domestic governments to penalize domestic companies for

201. *See What We Do,* NAT'L LAB. RELATIONS BOARD, https://www.nlrb.gov/about-nlrb/what-we-do (last visited Jan. 30, 2022).

202. *Id.*

203. *See Nasa Unions (Bargaining Units)*, NASA, https://www.nasa.gov/feature/nasa-unions-bargaining-units (last visited Jan. 30, 2022).

204. @snstevenson, TWITTER (Jul 2, 2022, 10:16 PM), https://mobile.twitter.com/snstevenson/status/1543418323525828609.

205. Rauenzahn et al., *supra* note 141.

206. *See id.*

207. *Id.*

208. Kramer & Walsh, *supra* note 23.

engaging in unethical practices that are associated with foreign supply chains, complications arise when regulatory responsibilities are not clearly defined.[209] Moreover, as the United States struggles to keep companies in check on the ground, it will present an even bigger challenge as these companies expand into space.[210]

A. *The Gaps in Space Law*

The problem that regulators are facing in this "new space era" is that there are significant legal ambiguities that exist now that private space companies are sending people and objects into orbital space.[211] While there are regulatory schemes in place such as the FAA and the Outer Space Treaty, "existing space law has not kept up with" the expansion of the private industry into space exploration, "and the United States lacks a comprehensive regulatory regime."[212] In anticipation of a growing commercial space industry, experts and scholars have called for more robust regulation.[213] Without a global management system or a governing authority for the private commercial development of outer space resources, outer space could turn into the "Wild West of the twenty-first century".[214]

209. *See* Harry Cassin, *Does the FCPA Apply... In Space?*, THE FCPA BLOG (Jan. 24, 2023), https://fcpablog.com/2023/01/24/does-the-fcpa-apply-in-space/.

210. *See generally* Christine Murray, *U.S. Urged to Get Tougher on Companies over Forced Labor Abroad,* REUTERS (Jan. 13, 2021), https://www.reuters.com/article/us-usa-trafficking/u-s-urged-to-get-tougher-on-companies-over-forced-labor-abroad-idUSKBN29I2XM (asserting that the United States must do more to prevent forced labor and exploitation abroad in the supply chains of U.S. companies).

211. Samuel Stockwell, *Legal 'Black Holes' in Outer Space: The Regulation of Private Space Companies*, E-INT'L RELS. (July 20, 2020), https://www.e-ir.info/2020/07/20/legal-black-holes-in-outer-space-the-regulation-of-private-space-companies/.

212. Rauenzahn et al., *supra* note 141.

213. *See* Kramer & Walsh, *supra* note 23. Graduate researcher David Colby Reed in the Space Enabled research group at the MIT Media Lab opined, "One challenge I see facing private space exploration is that the leaders of space exploration companies will set the objectives, rules, and sanctions that govern space habitations and missions, likely with profit maximization as the goal." *Id.* "This is business-as-usual on Earth, but, in space, such private government becomes totalizing." *Id.* "That control over both everyday life and work could create a situation where 'it's difficult for a free society of equals to take root." *Id; see also* Prakash Chandra, *Outer Space Treaty Has Ambiguities Allowing Unhindered Exploitation of Celestial Bodies*, THE ECON. TIMES (Feb. 14, 2015, 4:12 AM IST), https://economictimes.indiatimes.com/news/science/outer-space-treaty-has-ambiguities-allowing-unhindered-exploitation-of-celestial-bodies/articleshow/46238718.cms?from=mdr (finding that a lack of regulation could lead to a "chaotic free-for-all scramble" as companies from the United States and international companies race to establish industrial bases in space).

214. Hope M. Babcock, *The Public Trust Doctrine, Outer Space, and the Global Commons: Time to Call Home ET*, 69 SYRACUSE L. REV. 191, 192 (2019).

The Outer Space Treaty "espoused the principle that space should be developed for the benefit of all mankind and banned both private ownership and militarization of space resources."[215] However, it "left the development of a system of managing non-military activities in [outer] space for another day."[216] Private commercial companies, who will be "absorbing the risks and paying the high costs of space development, oppose any management scenario premised on the principle" that space exploration should benefit all of mankind, as it would enable less developed countries to free ride on their developments and hard work.[217] However, establishing a regulatory scheme without that basic principle would transport Earth's division between the "haves and have-nots" into outer space, leading to the very hostilities that the drafters hoped to avoid.[218]

i. Article VI of the Outer Space Treaty

As noted above, many commentators believe that Article VI of the Outer Space Treaty[219] espouses the principle that private entities may not operate without governmental authorization and continuing supervision.[220] This provision requires the "appropriate state party" to authorize and continually supervise the activities of its non-governmental actors (like private commercial entities) in outer space.[221] However, the Outer Space Treaty gives no further details on what types of regulations a government should impose on these private entities.[222] The FAA itself has said that they may deny access to space to unauthorized parties.[223] However, other commentators believe that the reality is that the FAA and other regulatory agencies may not rely on Article VI to deny private actors access to space.[224] In a testimony provided to the House Committee on Science, Space and Technology, Laura Montgomery, professor of space law

215. *Id.*
216. *Id.*
217. *Id.*
218. *Id.*
219. *See* Outer Space Treaty, *supra* note 63 (adopted by the General Assembly in its resolution 2222 [XXI] and entered into force on October 10, 1967).
220. *See supra* Section I.a.1.
221. Outer Space Treaty, *supra* note 63, at Art. VI.
222. *See* Schaefer, *supra* note 11, at 320.
223. *See* Laura Montgomery, US Regulators May Not Prevent Private Space Activity on the Basis of Article VI of the Outer Space Treaty 3 (Mar. 28, 2018) (unpublished paper) (on file with the Mercatus Center at George Mason University).
224. *See id.* at 7.

at Catholic University's Columbus School of Law,[225] takes the position that Article VI does not require the U.S. to regulate its commercial space activities.[226] Her reasoning resides in the fact that the treaty itself does not explicitly prohibit private activities, it simply imposes the obligation on the United States and other countries to be responsible for the acts of its nationals.[227] Additionally, she states that the treaty is not self-executing, which means that without an explicit act of Congress applying it to a private space activity and assigning authority over that specific activity to a regulatory agency, it does not have the force of law within the United States.[228]

As new private companies entered the space traveling sphere, the executive branch under President Obama prepared a report on what to do about these new, private space actors.[229] Section 108 of the Commercial Space Launch Competitiveness Act required the director of the White House Office of Science and Technology Policy to meet with the heads of agencies and the commercial space sector to, "recommend an authorization and supervision approach that would prioritize safety, utilize existing authorities, minimize burdens to the industry, promote the U.S. commercial space sector, and meet the United States obligations under international treaties."[230] The executive branch report (often referred to as the "OSTP Section 108 report") said that, although the existing framework regulating space activity has served the United States well by addressing existing commercial space activities,

> [T]hey do not, by themselves, provide clear avenues through which the U.S. Government can fulfill its Article VI obligations in relation to the newly contemplated commercial space activities . . . The

225. *See Ground Based Space Matters,* SPACE LAW AND POLICY, https://groundbasedspacematters.com/index.php/about/ (last visited Feb. 3, 2022). Laura Montgomery spent over two decades with the Federal Aviation Administration. *See id.* She served as the manager of the Space Law Branch in the FAA's office of the Chief Counsel, and before that she was the FAA's Senior Attorney for Commercial Space Transportation. *See id.*

226. *See generally* Montgomery, *supra* note 223 (focusing on regulatory limitations as it pertains to government regulation of private space activity).

227. *See id.*

228. *See id.* Even though the Constitution describes treaties as the "supreme law of the land," they must be self-executing to be enforceable federal law if there is no legislation from congress implementing it. *Id.* at 13. The Supreme Court has stated, "not all international law obligations automatically constitute binding federal law enforceable in United States courts." *Id.* at 16.

229. *See id.* at 6.

230. U.S. Commercial Space Launch Competitiveness Act, Pub. L. No. 114-90, 129 Stat. 704, 708 (2015).

> economic vitality of the American space industry is best served with a clear and predictable oversight process that ensures access to space and imposes minimal burdens on the industry.[231]

In sum, Article VI leaves three decisions to each country that is a party to the Outer Space Treaty: "What form should an authorization take? How frequent must the continuing supervision be? And what activities require any authorization at all?"[232]

In response to Laura Montgomery's argument that Article VI of the Outer Space Treaty is unenforceable, the U.S. Department of Defense's John S. Goehring published a rejoinder stating that the United States has an affirmative obligation to authorize and continue to supervise government and non-government space activities.[233] Mr. Goehring's argument resides in the negotiations that occurred in the creation of the Outer Space Treaty.[234] During these negotiations Manfred Lachs, the chairman of the Legal Subcommittee of the United Nations COPUOS, stated, "[s]tates bear international responsibility for any activity in outer space, irrespective of whether it is carried out by governmental agencies or non-governmental entities."[235] According to Lachs, "this is intended to ensure that any outer space activity, no matter whom conducted, shall be carried out in accordance with the relevant rule of international law, and to bring the consequences of such activity within its ambit."[236] States became responsible for the commercial space activity because of the compromise between the United States and the Soviet Union, according to Goehring.[237] The United States wanted commercial space activity to be eventually open to private entities, while the Soviet Union wanted to restrict them, thus Article VI was a negotiated settlement in which private space activity is

231. Letter from John P. Holdren, Director & Assistant to the President, Office of Science and Technology Policy, to Chairmen Thune and Smith (hereinafter the OSTP Section 108 report), 3 (Apr. 4, 2016).

232. Montgomery, *supra* note 223, at 30.

233. *See* John Goehring, *Properly Speaking, the United States Does Have an International Obligation to Authorize and Supervise Commercial Space Activity*, 78 A.F.L. REV. 101, 105 (2018). Article VI establishes the obligation, but it does not prescribe any method or standards for meeting the obligation. *See also* Ronald L. Spencer, *State Supervision of Space Activity*, 63 A.F.L. REV. 75, 82 (2009).

234. *See* Goehring, *supra* note 233, at 103.

235. MANFRED LACHS, THE LAW OF OUTER SPACE: AN EXPERIENCE IN CONTEMPORARY LAW MAKING 113-14 (Tanja Masson-Zwaan & Stephan Hobe eds., 2010).

236. *Id.* at 114.

237. *See* Goehring, *supra* note 233, at 110.

permitted as long as the states assumed direct responsibility over it.[238] Goehring therefore argues that the problem is how the government should fulfill the requirement that they need to supervise these private actors, not that the requirement is nonexistent.[239] Nevertheless, there are still gaps in these laws that need to be addressed.

Finally, Goehring addresses Montgomery's non-self-executing argument.[240] In *Medellin v. Texas,* the Supreme Court addressed the question of non-self-executing treaties and held that, "while a treaty may constitute an international commitment, it is not binding domestic law unless Congress has enacted statutes implementing it or the treaty itself conveys an intention that it be 'self-executing' and is ratified on that basis."[241] Goehring agrees that Montgomery's position that the treaty is not self-executing is a reasonable one, however, he acknowledges that no United States court or Congress has explicitly taken up the issue of whether the Outer Space Treaty—or any provisions within it including Article VI—is or is not self-executing.[242] Therefore, Goehring believes that any definitive statement on the matter is "purely speculative."[243] Nevertheless, as both of these arguments continue to persist throughout the legal

238. *See id.*; Bin Cheng, *Article VI of the 1967 Space Treaty Revisited: "International Responsibility", "National Activities", and "The Appropriate State*, 26 J. SPACE L. 7, 14 (1998) [hereinafter *Article VI Revisited*]; *see also* Ram Jakhu, *Legal Issues Relating to the Global Public Interest in Outer Space,* 32 J. SPACE L. 31, 44 (2006).

239. *See* Goehring, *supra* note 233, at 112.

240. *Compare* Goehring, *supra* note 233, at 112 (taking the position that the Outer Space Treaty is self-executing), *with* Montgomery, *supra* note 223, at 30 (taking the position that without an explicit act of Congress, the Outer Space Treaty is not self-executing, and claims unless Congress acts, "regulatory agencies should not treat Article VI as a barrier that applies to commercial actors or claims that it prohibits all or any particular private activity.").

241. Medellin v. Texas, 552 U.S. 491, 523 (2008). The power of non-self-executing treaties is grounded in the United States Constitution, which divides the treaty-making power between the President and the Senate. *See id.* at 526. The Constitution vests the Present with the authority to "make" a treaty. U.S. CONST. Art. II, § 2. By definition, a non-self-executing treaty is one that was ratified with the understanding that it does not have its own domestic effect. *See Medellin,* 552 U.S. at 527. If the president determines that a treaty should have domestic effect, then the Executive should ensure that it contains language that plainly provides for domestic enforceability. If the treaty is to be self-executing, the Senate must consent to the treaty by two-thirds vote, consistent with all other constitutional restraints. *See id.* at 526. However, if a treaty is ratified without provisions that clearly accord its domestic effect, the power to make the necessary laws is vested in Congress. *See id.* The terms of a non-self-executing treaty can become domestic law the same way as any other law, through passage of legislation by both Houses of Congress, and with either the President's signature or a congressional override of a Presidential veto. *See* U.S. CONST. Art. I, § 7.

242. *See* Goehring, *supra* note 233, at 114.

243. *Id.*

community today, Congress must take up the question of whether and how to regulate "near-future commercial space activities."[244]

ii. The Moon Agreement

The most recent treaty, the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (hereinafter "the Moon Agreement") addresses the exploration of the moon and exploration of all celestial bodies within our solar system.[245] The Moon Agreement expands on the general principles set forth in the Outer Space Treaty regarding a peaceful and shared use of outer space.[246] As discussed above, the Outer Space Treaty arguably does not apply to private entities, because at the time it was drafted, governmental entities were the only entities expected to have the resources to travel to space.[247] The Moon Agreement, however, attempts to fill that gap by explicitly prohibiting private legal entities from claiming territory in outer space.[248] Despite the Moon Agreement's attempt to fill the gap that the Outer Space Treaty creates, the key problem is that the United States is not a party to the treaty.[249]

244. *Id.* at 123.

245. *See* Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, opened for signature Dec. 18, 1979, G.A. Res. 34/68, U.N. GAOR, 34th Sess., Agenda Items 48, 49, at 1, U.N. Doc. A/Res/34/68 (1979), reprinted in 18 I.L.M. 1434-41 (1970) [hereinafter Moon Treaty].

246. *See generally id.* (establishing a shared use of Outer Space and making changes and innovations to the Outer Space Treaty). Article 4 of the Treaty repeats the provisions of the first article of the Outer Space Treaty. *Id.* at Art. IV. The final version of the Moon Treaty includes a nine-paragraph preamble and twenty-one articles. *See* Scott F. Cooper, *The 1979 Agreement Governing the Activities on the Moon and other Celestial Bodies: Does it Create a Moratorium on the Commercial Exploitation of the Moon's Natural Resources?* 5 J. L. & TECH. 63, 67 (1990). The preamble sets forth the goals of the treaty which includes the desire to keep space law contemporary with changing technology, promotion of outer space exploration and the coherent extension of prior established outer space law. *Id.* at 67-68. Article XI is the center of the Moon treaty, as it sets forth the idea of the "common heritage of mankind" which has been a central debate among the legal community for years. *Id.* at 68.

247. *See supra* Section III.a.1.

248. Moon Treaty, *supra* note 245, at Art. 12(1).

249. *See* David Everett Marko, *A Kinder, Gentler Moon Treaty: A Critical Review of the Current Moon Treaty and a Proposed Alternative*, 8 J. NAT. RESOURCES & ENVTL. L. 293, n.191 (1992-93):

> [I]t is also true that very few third world countries have signed the Moon Treaty. However, that is a product of the first world's rejection of the treaty and the dilution of the common heritage concept in the final draft which one could argue will lead to more global inequality.

Id.

Thus, all hope that the Moon Agreement fills the gaps that prevent private exploitation and the monopolization of outer space, becomes lost.[250]

B. *Current Workplace Conditions*

It may seem implausible to draw attention to workers' rights in space now, but there is already evidence of worker exploitation at the heart of some of these companies.[251] Founder of Blue Origin, Jeff Bezos, seems optimistic about the future of commercial space flight, predicting that space stations will be the Earth's solution to the expanding population and energy needs.[252] Yet, although these hopes are realistic, recent problems concerning Bezos' workplace conditions should give regulators a cause for concern.[253] Not only does Bezos' company Amazon have a well-documented high rate of worker injuries and worker exploitation at its warehouses, but recent allegations about Bezos's Blue Origin workplace are also skyrocketing.[254] On September 30, 2021, a letter signed by twenty-one current and former Blue Origin employees was published online that claimed the company fosters a "toxic" and sexist environment that leaves the staff feeling "dehumanized," and causing some to have suicidal thoughts.[255] The letter also accuses the company of putting work ahead of safety in order to get ahead of other rival spaceflight companies.[256] Some employees even said that they would not ride on the actual rocket when it came time to in the future because of concerns about the safety of

250. *See supra* Section III.a.1.

251. *See* E&T editorial staff, *Bezos' Blue Origin Workplace is 'Sexist and Toxic' While Company Sues NASA Over Moon,* E&T MAGAZINE (Oct. 1, 2021), https://eandt.theiet.org/content/articles/2021/10/bezos-blue-origin-workplace-called-out-as-sexist-and-toxic-while-company-sues-nasa-over-moon/.

252. *See* Tozzi, *supra* note 13.

253. *See* E&T editorial staff, *supra* note 251.

254. *See id.*

255. *See id.*

256. *See id.* Other billionaires like Richard Branson, who created Virgin Galactic and Elon Musk who owns SpaceX are among these competitors that Bezos attempts to beat to space. *See id.* The letter stated, "When Jeff Bezos flew to space this July, we did not share his elation, instead, many of us watched with an overwhelming sense of unease. Some people couldn't bear to watch at all." *Id.* Another part of the letter stated, "if this company's culture and work environment are a template for the future Jeff Bezos envisions, we are headed in a direction that reflects the worst of the world we live in now, and sorely needs to change." Sinead Baker & Grace Kay, *Open Letter From Former and Current Blue Origin Employees Accuses Jeff Bezos of Sacrificing Safety in an Effort to Win the Billionaire Space Race – and Creating a Toxic, Sexist Work Culture Along the Way,* BUS. INSIDER (Sept. 30, 2021, 9:05 AM), https://www.businessinsider.com/blue-origin-employee-accuse-company-sacrificing-safety-2021-9.

the passengers.[257] One person said that the Blue Origin founder is "lucky" that nothing catastrophic has happened yet.[258]

After these allegations were published, another set of allegations came to light as well, however this time directed at Elon Musk and his company SpaceX.[259] Employees of SpaceX complain that sexism radiates throughout the company and that there have been multiple incidents where employees were sexually harassed.[260] Ashley Kosak, a former mission integration engineer at SpaceX stated,

> [T]hese conditions would be disturbing anywhere, but in this particular workplace, we are blazing a trail to settle a new planet. What will life on Elon's Mars be like? Probably much like life at SpaceX. Elon uses engineers as a resource to be mined rather than a team to be led. The health of the Earth is rarely a consideration in the company's projects. Misogyny is rampant.[261]

More complaints stemmed from the company's demanding pace and long work hours, as well as a work environment that is largely male dominated.[262] While there are laws in place that protect against these toxic work environments,[263] it should concern regulators how much these laws are being ignored within these workplaces, and the difficulty they are going to have enforcing them when these employees are no longer in our own atmosphere and where employers do not have clear guidelines to follow.[264]

C. *The First Crime in Space*

To parallel the pressing issue of an absence of labor laws and regulation for private actors in space, we can look to current events that have

257. *See* E&T editorial staff, *supra* note 251.

258. *See id.*

259. *See* Eric Berger, *Concerns About Sexism in the Aerospace Industry Land at SpaceX*, ARSTECHNICA (Dec. 14, 2021, 3:30 PM), https://arstechnica.com/science/2021/12/concerns-about-sexism-in-the-aerospace-industry-land-at-spacex/.

260. *See id.*

261. *Id.*

262. *See id.* The space industry began largely as military operations in the United States, and since then has been male dominated. *See id.* Even though NASA strives for a diverse workforce, the ratio of male employees to women employees was two-to-one, and at the senior level of management the ratio was more than four-to-one. *See id.* "If left unresolved, insiders are concerned this culture could someday extend to astronauts on assignment or deep space colonization efforts." *Id.*

263. *See* discussion *supra* Section III.c.

264. *See* Baker & Kay, *supra* note 256.

foreshadowed the coming problems with the advent of space tourism and commercial activity in space.[265] Just recently, NASA reported that it is investigating what could be the first crime committed in space.[266] Astronaut Anne McClain has been accused of accessing her estranged spouse's bank account though the internet while aboard the International Space Station.[267] This gave rise to the question of what criminal law, if any, applies to this astronaut?[268] According to NASA, the simple answer is that U.S. law applies because the incident happened aboard the International Space Station with both the victim and the accused being from the U.S. However, the real answer is much more problematic.[269] Space, like the high seas, is considered *res communis*, meaning, it belongs to every nation and no nation simultaneously.[270] Generally, a spacefaring criminal would be subject to the law of the country of which they are a citizen, or aboard whose registered spacecraft the crime was committed on, as the treaty grants that country authority "over any personnel thereof."[271] However, the treaty does not define the term "personnel" so the issue lies in what might be the case for private citizens flying on foreign aircrafts or international employees working for a United States company.[272] This same question can be posed in the labor context—what labor laws would apply in an employment discrimination case, where two private entities may be working together from separate countries on a single project, or an

265. *See* Danielle Ireland-Piper, *Star Laws: What Happens if You Commit a Crime in Space?*, THE CONVERSATION (Aug. 27, 2019, 4:12 PM EDT), https://theconversation.com/star-laws-what-happens-if-you-commit-a-crime-in-space-122456.

266. *See id.*

267. *See id.* McClain has denied these accusations. *See id.*

268. *See id.*

269. *See id.*

270. *See id.* The terms *res communis* and *res nullius maxims* are two legal concepts that carry great significance in the legal world, especially in the areas relating to the high seas, outer space, and Antarctica. Louis de Gouyon Matignon, *The Res Communis Concept in Space Law,* SPACE LEGAL ISSUES (Feb. 28, 2019), https://www.spacelegalissues.com/space-law-the-res-communis-concept-in-space-law/. This concept, also known as "common heritage," is one of the most extraordinary developments in recent intellectual history and one of the most radical legal concepts to have emerged in recent decades. *Id.* The year 2017 was the fiftieth anniversary of the adoption of this concept in the domain of public international law (the Outer Space Treaty), and has been the center of intensive debates, controversy, and confrontation. *See id.* Some commentators believe that the Outer Space Treaty and its res communis doctrine should be rethought. *See id.*

271. *See* Ireland-Piper, *supra* note 265.

272. *See id.* For example, an Australian tourist flying aboard a United States registered space craft, may create problems if a crime were to be committed on the U.S. spacecraft by that tourist. *See id.*

employee from a different country is suffering at the hands of an employer based United States.[273]

The International Space Station (hereinafter "ISS") does have its own intergovernmental agreement, which expressly provides for nationality-based jurisdiction over crime, stating, "Canada, the European Partner States, Japan, Russia, and the United States may exercise criminal jurisdiction over personnel in or on any flight element who are their respective nationals."[274] The issue with McClain remains simple because both her and her alleged victim are United States Citizens.[275] Further, while this intergovernmental agreement may provide some clarity, it is unlikely that space tourists will be aboard the ISS, so this agreement will not apply.[276] It is likely that the criminal law (or labor laws) of the country of registration of the space vehicle would apply, but it could become problematic if the countries whose citizens are on board also attempt to claim jurisdiction.[277]

IV. SOLUTION

Advancements in space have always been, and must continue to be, a global collaborative effort.[278] With the increase in space tourism and the advent of private companies announcing plans to travel to space, it is time for Congress to revisit the FAA's rules and work with international governments to more closely regulate the commercial space flight industry.[279] Within the next year, more than a dozen private citizens are scheduled to launch on a commercial spacecraft, opening up an industry that analysts predict could be worth more than $8 billion by the year 2030.[280] The tension exists between the lack of regulation in the growing commercial spaceflight industry and the pushback against overly burdensome rules that some say will halt the tremendous progress the United States

273. *See infra* Section IV.d.

274. A. Yakovenko, *The Intergovernmental Agreement on the International Space Station*, 15 SPACE POLICY 79, 81 (1999).

275. *See* Ireland-Piper, *supra* note 265.

276. *See id.*

277. *See id.*

278. *See generally supra* Section II (discussing the development of space law and the way separate nations have worked together to develop a treaty that prevents monopolization).

279. *See* Christian Davenport, *Richard Branson and Jeff Bezos Willy Fly to Space at Their Own Risk, Does That Make it Right for Everyone?*, WASH. POST (June 23, 2021, 12:10 PM EDT), https://www.washingtonpost.com/technology/2021/06/23/space-tourism-faa-regulation/.

280. *See id.*

has made.[281] Some members of Congress suggest that space travel should be more in line with the way commercial aviation is regulated.[282] Although the FAA requires launch companies to protect people and property on the ground, the passengers are only governed by an "informed consent" standard, which means that they are made aware of the risks, and all they must do is sign a waiver.[283] Advocates say that regulations that would govern requirements for pilots, how they are trained, the way spacecrafts are designed and manufactured, and regulations for employees working on these space crafts could hinder innovation in an area that needs the freedom to grow and develop.[284] Others believe this is a dangerous game, and the time has come for stricter regulation on the industry.[285]

The commercial space industry in the United States is growing at unprecedented rates, and a lack of regulation for these private companies could prove to be disastrous, with private companies exploiting space for their own benefit, creating monopolies, and posing a risk to the general public.[286] The FAA has already opened an investigation into SpaceX, who has launched a prototype spacecraft without authorization.[287] However, despite the risk of hindering innovation, launching spacecrafts without regulation has implications with other nations as well, so the FAA's main priority must be safety.[288]

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281. *See id.*

282. *See id.*

283. *See id.* The only thing that is required for these passengers is that they are made aware by these private companies that, "the United States government has not certified the launch vehicle and any reentry vehicle as safe for carrying flight crew or spaceflight participants." *Id.*

284. *See id.* Leading Republicans on the House, Space and Technology Committee disagree with regulation, and in a letter to Transportation Secretary Pete Buttigieg, Reps. Frank D. Lucas (Okla.) and Brian Babin (Tex.) wrote, "additional regulation at this point would stifle innovation, export technology, talent, and tax dollars overseas, and undermine American leadership in space." *Id.*

285. *See id.* There is a congressionally mandated learning period in place until 2023, which means that the FAA's hands will be tied until then.

286. *See id.*

287. *See id.* Earlier this year, Elon Musk, founder of SpaceX tweeted, "unlike its aircraft division, which is fine, the FAA space division has a fundamentally broken regulatory structure. Their rules are meant for a handful of expendable launches per year from a few government facilities. Under those rules, humanity will never get to Mars." *Id.*

288. *See generally id.* ("Our company's North Star is and always will be safety, a mind-set that we know is shared throughout the commercial space sector."). Wayne Hale, a senior executive at NASA says there should be separate standards for purely commercial space missions and those funded by the government. *See id.*

A. *Defining Astronaut Status*

As discussed above, much of the difficulty in private space flight lies in who is defined as an astronaut, and whether those that are not defined as an astronaut must comply with the few FAA rules and regulations already in place.[289] Should the owners of the private businesses, such as Elon Musk, Jeff Bezos, and others be considered "astronauts" under the law? The first objective is to define the legal status of astronauts. For this approach, Congress should enact a statutory definition to clear all ambiguities like that of the statutory regulations for commercial flight in the United States.[290]

The statute should make clear that the FAA regulations should remain in place for all employees and spacefaring contestants, who work for governmental entities, such as NASA, and that this statute only applies to purely private entities, and the definition in place for astronauts should remain in place but for only government funded expeditions.[291] The statute should define the person who is controlling the flight, whether it be from the ground, or from the aircraft,[292] as the "pilot in command."[293] The statute that is in place for aviation states that, "no person who holds a private pilot certificate may act as pilot in command of an aircraft that is carrying passengers or property for compensation or hire; nor may that person, for compensation or hire, act as pilot in command of an aircraft."[294] The statute also states, "A private pilot may, for compensation or hire, act as pilot in command of an aircraft in connection with any business or employment if: (1) the flight is only incidental to that business or employment...[]."[295] Under this language, any person controlling and operating the spacefaring vehicle and doing so "incidental to" the company's business should be known as the "pilot in command" and subject to a separate set of rules and regulations.[296]

289. *See supra* Section II.a.3.

290. *See* 14 CFR § 61.81(a) 113 (discussing "Private pilot privileges and limitations" and "Pilot in Command").

291. *See id.* The statute explicitly states "private." *Id.*

292. Jeff Bezos's Blue Origin flight was controlled entirely from the ground. *See* Crane, *supra* note 126.

293. 14 C.F.R. § 61.113-(a).

294. 14 C.F.R. § 61.101(a).

295. 14 C.F.R. § 61.113.

296. *See infra* Section IV.b.

> Under the aviation standards, pilot in command means the person who: (1) has final authority and responsibility for the operation and safety of the flight; (2) has been designated as pilot in command before or during the flight; and holds the appropriate category, class, and type rating, if appropriate, for the conduct of the flight.[297]

These same standards should be imposed on the pilot in command for space flight. While "astronauts"—those working for a government funded entity—have certain obligations, such as being "envoys of mankind,"[298] pilots in command should also have these same obligations, while also adhering the mission of their respective companies. This leaves room for innovation, where each company can create its own goals and enable a workforce to carry out these goals, as long as it does not interfere with foreign operations.[299]

Other personnel working for the spacecraft, while aboard the spacecraft or on the ground, should have the same legal status as flight attendants under the aviation standards.[300] Under these statutory requirements,

> Flight attendant means an individual, other than a flight crewmember, who is assigned by a certificate holder conducting domestic, flag, or supplemental operations, in accordance with the required minimum crew complement under the certificate holder's operations specifications or in addition to that minimum complement, to duty in an aircraft during flight time and whose duties include but are not necessarily limited to cabin-safety-related responsibilities.[301]

These "flight attendants" or "ground crew/crew members" are therefore obligated to ensure the safety of the aircraft and ensure that the passengers are flying under the safest conditions. Those that are on the spacecraft, purely for joyrides and "tourism" should be considered passengers on a domestic or international flight into and out of the United States. Passengers on the spacecraft should not interact with other nation's space vehicles on the ISS if they come into contact with these vehicles, unless authorized by the opposing nation before the mission begins.

297. 14 C.F.R. § 1.1.

298. *See supra* Section II.a.3.

299. *See* Davenport, *supra* note 279 (discussing the tension between the FAA and its regulations, and private industries who believe that space flight should be subject to less regulation in order to promote innovation and growth).

300. 14 C.F.R. § 121.467.

301. *Id.*

B. *Independent Arbitration*

The astronauts aboard Skylab 4,[302] much like the workers who may be aboard a private industries spacecraft in the near future, must have somewhere to bring disputes and claims against their employers and co-workers. The ICC Commission on Arbitration and ADR is comprised of approximately 1,000 members from more than 92 countries comprising lawyers, in house counsel, arbitrators, mediators, law professors and experts in various dispute resolution fields.[303] This organization is the institutional representative of more than 45 million companies in over 100 countries, its mission is to make business work for everyone, everywhere.[304] The ICC represents business interests at the highest levels of intergovernmental decision-making.[305] Arbitration under the ICC Arbitration Rules, "is a formal procedure leading to a binding decision from a neutral arbitration tribunal, susceptible to enforcement pursuant to both domestic arbitration laws and international treaties..."[306] Arbitration is an attractive alternative to litigation for many companies, as it is a neutral body that provides reliable solutions that help save time and money.[307] As this note seeks to fill in the gaps that the international treaties leave open, one way to do so will to create an independent arbitration committee, much like to ICC Commission on Arbitration, comprised of delegates, attorneys, arbitrators, mediators, and heads of space institutions from each member state of the Outer Space Treaty to deal with legal issues that might arise from disputes occurring outside of our atmosphere. There may be different divisions, each with its own set of individuals equipped to deal with the various disputes that may arise. Labor disputes, in particular, should be brought to the attention of the labor division, civil disputes brought in its own respective division and so forth. Thus, this independent and separate commission which will focus solely on the disputes occurring in space or between spacefaring companies, takes the pressure off of

302. *See supra* Section II.b.

303. *See* Commission on Arbitration and ADR, ICC INT'L CHAMBER OF COMMERCE, https://iccwbo.org/dispute-resolution-services/commission-on-arbitration-and-adr/ (last visited Feb. 20, 2022).

304. *See id.* The ICC, "plays a vital role in scaling widespread action on Sustainable Development Goals and has a long history of formulating the voluntary rules by which business is conducted every day." *Id.*

305. *See id.*

306. *Id.*

307. *See id.*

existing government organizations that have become increasingly overwhelmed with the number of labor disputes brought before them.

C. *Amending the Outer Space Treaty*

To implement the policies and arbitration tribunals set forth in this note,[308] the Outer Space Treaty must be amended to explicitly include commercial space flight. Article 39 of the Vienna Convention on the Law of Treaties states, "a treaty may be amended by agreement between the parties... except in so far as the treaty may otherwise provide."[309] The rule applies whether a treaty is bilateral or multilateral.[310] In addition to the general principle, Articles 40 and 41 contain residual procedural rules that guide the amendment of multilateral treaties, stating,

> [A]ny proposal to amend a multilateral treaty as between all parties must be notified to all contracting States, each one of which shall have the right to take part in: (a) the decision as to the action to be taken in regard to such proposal; (b) the negotiation and conclusion of any agreement for the amendment of the treaty.[311]

The Articles continue to state that every state that is a party to the current treaty shall also be "entitled to become a party to the treaty as amended."[312] Thus, all nations a party to the United States Treaty must amend the treaty together.[313] The amendments to the treaty should set forth the creation of an international arbitration commission that requires all disputes be settled in their respective divisions, and should explicitly identify which personnel (astronauts, pilots in command, flight attendants/crew members, and passengers) must adhere to the general principles set forth in the Outer Space Treaty.[314] The treaty should also more clearly establish that each nation that is a party to the treaty is fully responsible and must have their own independent regime for regulating commercial space flight, that must be approved by each member nation. This allows

308. *See supra* Section IV.a-b.

309. Vienna Convention on the Law of Treaties art. 39, *opened for signature* May 23, 1969, 1155 U.N.T.S. 331 (entered into force Jan. 27, 1980).

310. *See* Carl Islam, *Diplomatic Law Guide*, WORDPRESS., http://newsite.diplomaticlaw-guide.com/treaties (last visited Feb. 20, 2022).

311. Vienna Convention on the Law of Treaties art. 40, *opened for signature* May 23, 1969, 1155 U.N.T.S. 331 (entered into force Jan. 27, 1980).

312. *Id.*

313. *See generally id.* (espousing the principles by which treaties may be amended).

314. *See supra* Section II.a.1.

for autonomy, as well as ensures the safety and agreement of each of the member nations. Finally, the treaty should set forth principles regarding choice of law and which state's law governs in disputes. Workers on one aircraft, who may eventually be working on a project with workers on another state's aircraft, may have labor disputes with their "co-workers" and it may be difficult to determine which state's law applies.[315]

D. *Choice of Law- Which Labor Laws Should Apply?*

Maritime law is often used as a reference point when hypothesizing how law can be applied in space.[316] As we have seen however, certain actors continue to take advantage of these laws as well.[317] The practice of ships flying a "flag of convenience" allows companies based in strictly regulated countries to take advantage of less stringent laws that are in place in other countries to maximize their profits.[318] Panama for example, is a small country that is home to the world's largest shipping fleet. The reason for this being that this practice allows corporations such as large cruise companies to be headquartered in Miami, yet not pay U.S. corporate income tax, and engage in labor practices that would be illegal in the United States.[319]

Maritime law, while not entirely complete, should be a starting point for certain laws to protect individual rights.[320] The Law of the Sea specifically details the duties that each state has regarding vessels, principles of liability, and regulatory regimes to protect the environment that may provide some useful analogies to adapt to space law.[321] The Law of the Sea, a branch of international law concerned with public order of the sea is codified in the United Nations Convention on the Law of the Sea.[322] The convention is described as the "constitution for the oceans"[323] and is

315. *See supra* Section III.c; *see also infra* Section IV.d.

316. *See* Tozzi, *supra* note 13.

317. *See id.*

318. *Id.*

319. *See id.*

320. *See* Schaefer, *supra* note 11.

321. *See id.*

322. *See* United Nations Convention on the Law of the Sea art. 87, Dec. 10, 1982, 1833 U.N.T.S. 397 (entered into force Nov. 16, 1994) [hereinafter UNCLOS].

323. Much like the Outer Space Treaty has coined the term "constitution of space." *See* Robin R. Churchill, *Law of the Sea*, BRITANNICA (Feb. 7, 2022), https://www.britannica.com/topic/Law-of-the-Sea. Similarly, the Outer Space Treaty has coined the term "constitution of space." *See* Abigail D. Pershing, *Interpreting the Outer Space Treaty's Non-Appropriation Principle: Customary International Law from 1967 to Today*, 44 YALE J. INT'L. L. 149, 152 (2019) ("[B]y far the most important

an attempt to codify international law regarding territorial waters, sea lanes, and ocean resources.[324] According to the 1982 convention, each country's sovereign territorial waters extend to a maximum of twelve nautical miles beyond its coasts, and foreign vessels are allowed to pass through these zones.[325] Beyond these territorial waters, every coastal country may establish an exclusive economic zone extending 200 nautical miles from shore.[326] Each coastal country has exclusive rights to the seabed within these 200 nautical miles and has the rights to the oil, gas and other resources in the seabed.[327] The high seas, which is much like outer space, is the portion of the sea that lies beyond the zones that are described above.[328] This portion of the water is open to all countries to use peacefully, much like outer space.[329] Legal matters in this vast stretch of the ocean are handled by which vessel the issue occurs on.[330] The model for space should analogize this model.[331] A zone should be established for each country, and beyond that zone, each country may explore those zones freely and peacefully.[332] The country whose spacecraft on which the dispute occurs should hold jurisdiction.[333] This too should be included in the amendments to the Outer Space Treaty or corresponding individual legislation.[334] The United States should individually create legislation that addresses and protects workers' rights in space and prevents the exploitation

and comprehensive is the Outer Space Treaty.") ("Referred to as the 'constitution of space,' the Outer Space Treaty is the primary document that establishes fundamental rules about States' activities in space.").

324. *See id.*

325. *See id.* "Passage is innocent as long as the ship does not refrain from engaging in certain prohibited activities, including 'weapons testing, spying, smuggling, serious pollution, fishing, or scientific research.'" *Id.*

326. *See id.* The EEZ "coastal state has the right to exploit and regulate fisheries and use them for their own benefit, and to construct islands and installations [and] use the zone for economic purposes." *Id.*

327. *See id.* "Where the [zones] . . . of neighboring countries overlap, a boundary line must be drawn by [separate] agreement to achieve an "equitable solution." *Id.* Some countries are unable to reach an agreement and, in those instances, the International Court of Justice or an arbitration tribunal will decide the matter. *Id.*

328. *See id.*

329. *See id.*

330. *See* John P. Rafferty, *Are There Laws on the High Seas?*, BRITANNICA, https://www.britannica.com/story/what-does-spf-mean (last visited Feb. 20, 2022).

331. *See id.*

332. *See* Churchill, *supra* note 323.

333. *See id.*

334. *See supra* Section IV.c.

of both workers and materials in outer space.[335] Each law should mirror our current labor laws and explicitly make clear that these laws apply to private actors aboard private space shuttles and stations.[336] Not only are there possibilities for the exploitation of workers' rights, but there are currently no Declaration of Human Rights that says that humans have a right to oxygen or a right to an open line of communication back to Earth. Therefore, the United States and neighboring countries must act to establish these basic rights.[337]

The laws should address and ensure that workers in outer space have a right to basic necessities and certain amounts of leisure time in order to ensure their safety. They should also address the amount of hours an individual may work, and his right to sue his employers for any negligence, oversight, or abuse of their agency relationship.[338] On Earth, it is not normally required that employers provide their employees with breathable air, food, or a habitable place to live.[339] In contrast, employees in space will be completely reliant upon their employer for the ability to breathe, survive, and be protected from outer space.[340] Thus, we need additional laws in place to address each of these issues.

E. *Protecting Workers' Rights*

There must be certain laws implemented to protect the rights of human beings who are working for companies that will send them to space for a certain time. Much different from a 9-5 workday, astronauts who currently work for NASA, as we have seen aboard the Skylab 4, are subject to stringent work conditions to ensure their health and safety while in space.[341] Thus, there must be laws in place to protect the health and safety of future employees of private companies working in space. Existing international agreements and labor protections can be used to establish a core group of basic laws for all workers that include: a free and easily accessible supply of breathable atmosphere, free food and water, free medical equipment aboard every flight, health and safety guidelines that

335. *See* Deanna Paul, *Space: The Final Legal Frontier,* WASH. POST (Aug. 31, 2019), https://www.washingtonpost.com/technology/2019/08/31/space-final-legal-frontier/.

336. *See id.*

337. S*ee id.*

338. *See* Alyson Decker, *Down to Earth- Labor Issues and Human Rights in Outer Space*, JUS AD ASTRA (July 2021), http://www.jusadastra.org/Labor_Issues.html.

339. *See id.*

340. *See id.*

341. *See supra* Section II.

must be complied with by everyone aboard, a habitable environment, a fair and just wage, reasonable work hours, reasonable work days and work weeks, and explicit laws that require that employers provide a safe right to return to Earth after termination of the individual's employment.[342]

Additional laws that protect workers' rights should be modeled after maritime laws as well. Maritime law is unique in that it is made of many different types of laws, few of which are codified. Much of maritime law relies on common law and case law.[343] The problem with this is that there has yet to be much development in the area of space law at common law or in case law.[344] Thus, Congress should work to codify these laws before problems begin to arise among these private companies. Per 46 U.S.C. §30104 of the Maritime Marine Act of 1920, seamen who suffer injuries while working on a qualifying sea-faring vessel can claim damages based on their losses and expenses.[345] This law should be incorporated into United States space law to ensure the safety of employees working aboard a spacecraft.

Moreover, the Death on the High Seas Act gives family members a way to recover compensation in the event their loved one dies because of an incident onboard an ocean ship.[346] This Act applies to workers who are not covered by the Jones Act, volunteers, passengers, and others on board.[347] These claims are based on negligence, and thus, the complainant will need to show that the boat's owner, operator or other party caused their death or accident.[348] This too should be incorporated into space law, and the passenger or employee must show that the "pilot in command" negligently caused the death or accident.[349] The Longshore and Harbor Workers' Compensation Act provides workers' compensation benefits to maritime workers that aren't on vessels, such as harbor workers, dockworkers, oil rig workers, and gas workers.[350] An act that mirrors this should be codified to address the rights of workers, such as the ground

342. *See* Decker, *supra* note 338.

343. *See* Southern Pacific Co. v. Jensen, 244 U.S. 205 (1917); *see also* Calbeck v. Travelers Ins. Co., 370 U.S. 114 (1962).

344. *See* Southern Pacific Co. v. Jensen, 244 U.S. 205 (1917); *see also* Calbeck v. Travelers Ins. Co., 370 U.S. 114 (1962); *see also* 46 U.S.C. § 30104.

345. *See* 49 U.S.C. § 30104.

346. *See* 46 U.S.C. § 30301.

347. *See id.*

348. *See id.*

349. *See generally id.* (stating that a captain should be held liable for the cause of death or injury when they are negligent).

350. *See* 33 U.S.C. § 901.

crew and technicians, who work for companies like SpaceX and Virgin Galactic. Thus, each law that applies and protects the rights of maritime workers should be implemented into United States space law to ensure the safety and protection of workers aboard spacecrafts.

CONCLUSION

The year 2022 marked the first successful effort to unionize an Amazon warehouse.[351] The movement was led by Amazon worker Christian Smalls, who believes that organized labor is essential to freedom in the United States of America.[352] After news of his success broke, Smalls was quoted outside of the National Labor Relations Board offices stating, "We want to thank Jeff Bezos for going to space, because, when he was up there, we were signing people up, we were out here getting signatures."[353] As this quote has resonated amongst workers across the country and has been prolific across social media platforms, it should be seen as a foreshadowing of the events to come as more and more companies expand into the private space sector.[354] There are significantly more opportunities for similar exploitation and abusive practices in space, where the unique space environment creates a completely different power dynamic between employers and their employees.[355] The right to rest and leisure is limited because of safety concerns, commercial space flight is advancing at unprecedented speeds, creating vexing problems for regulators across all countries who are not equipped to handle this rapid growth.[356] With this growth comes a responsibility on member nations to create regulatory regimes that can handle commercial space flight.[357] The Outer Space Treaty is merely a starting point for regulators, as it was created to

351. *See* Gabrielle Bienasz, *Amazon Labor Organizer Popped Champagne and Thanked Jeff Bezos for Going to Space*, BUS. INSIDER (Apr. 1, 2022), https://www.businessinsider.com/amazons-labor-organizer-popped-champagne-thanked-bezos-2022-4.

352. *See* Zeeshan Aleem, *Amazon Labor Union's Christian Smalls Skewered Lindsey Graham*, MSNBC (May 6, 2022), https://www.msnbc.com/opinion/msnbc-opinion/amazon-labor-union-s-christian-smalls-skewered-lindsey-graham-n1295209.

353. Bienasz, *supra* note 351.

354. *See id.*

355. *See generally* SPACE CONSTITUTION, https://www.spaceconstitution.com/ (last visited Feb. 23, 2022) (laying out a constitution to protect the people of earth who travel to space).

356. One organization, titled "Space Constitution" is so perplexed by the rapid growth of space exploration that they have begun to establish how human rights will work in space. *See id.* Their goals are to build a prototype space constitution and present the document to future potential sovereign nations. *See id.*

357. *See supra* Section III.

regulate international governments and provide a "province of mankind,"[358] to facilitate and promote "international co-operation in the peaceful exploration and use of outer space."[359] The various other treaties and conventions, such as the Rescue Agreement, the Liability Convention, the Registration Convention and the Moon Treaty, also establish these general principles that allow for the peaceful facilitation of spaceflight and space exploration between countries, however; they fail to address private industries and their obligations to each other and their own individual employees.[360]

Not only is there a lack of regulation, but confusion as to the duties of actors aboard the private spacecrafts.[361] Traditionally, Article V of the Outer Space Treaty classifies astronauts as a protected group that have certain rights and protections and should be emissaries of mankind.[362] However, questions now arise as to whether current actors that are simply passengers on new space endeavors should be afforded those same protections and given the same obligations to protect and represent respective nations.[363] There is much to be done in terms of creating titles for new actors flying to space, and how much these new actors need to be equipped with the knowledge and training that our current "envoys of mankind" have, and this note begins the discussions that regulators need to start having in order to prevent manipulation of the laws by private actors like SpaceX and Virgin Galactic.[364]

There are gaps in the current laws that do not address whether they apply to private companies taking passengers to space, and events in history such as the supposed Skylab Strike and current attempts to unionize here in the United States under the same people attempting to expand into space, foreshadow the coming issues that will arise as a result of a lack of regulation.[365] To address these gaps in space law, the legislature should adopt certain regulations and codify laws that mirror the laws that protect maritime workers, such as the Jones Act, the Maritime Marine Act, and

358. Doldirina, *supra* note 43; *see also supra* Section II.a.1.

359. 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), Jan. 27, 1967, 18 UST 2410; 610 UNTS 205; 6 ILM 386 (1967).

360. *See* Adolph, *supra* note 41, at 967-68.

361. *See supra* Section II.a.3.

362. *See supra* Section II.a.3.

363. *See supra* Section II.a.3.

364. *See supra* Section III.a.

365. *See supra* Section II.b; *see also supra* Section V (referencing the attempt to unionize by Amazon worker Christian Smalls).

the Longshore and Harbor Worker's Compensation Act, to protect ground crew and space flight crew working for private companies such as SpaceX and Virgin Galactic.[366] Not only that, but there needs to be an independent arbitration committee equipped with the proper knowledge and scientific research to handle issues that happen in space and between space-faring nations.[367] It may seem that regular voyages to and from space are years ahead of our capacity as a nation, but as technology advances at rapid speeds, the time to call for regulations and to act is right now.[368] Government-backed research programs such as NASA's Perseverance Rover on Mars or China's Tianhe space station continue to appear in headlines across the world.[369] This rapid growth of the private sector in space exploration and the response by regulators will define how humanity engages with space in the next century.[370] Regulators are in a unique position to act on these blind spots in labor laws to ensure the protections of human rights before the expansion into space by private actors becomes overwhelming.[371]

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366. *See supra* Section IV.e.
367. *See supra* Section IV.b.
368. *See supra* Section IV.
369. *See* Tozzi, *supra* note 13.
370. *See* Tozzi, *supra* note 13.
371. *See* Tozzi, *supra* note 13.

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