# INTERNATIONAL TRASH PICK-UP: THE NEED FOR A NEUTRAL ORBITAL DEBRIS REMOVAL ORGANIZATION

*Astina T. Shakilyan**



## I. BACKGROUND

The launch of Sputnik in 1957 transformed the human exploration of space forever. Today, the United States and other space-faring nations depend heavily on space to carry out daily activities such as the use of GPS,

* J.D. Candidate, Southwestern Law School (2021); I would like to thank my friends and family for their unwavering support throughout this entire process as well as the editors and staffers of the Southwestern Law Journal for their hard work. I would especially like to thank my beloved father, Vartan, who always encouraged me to work harder and never doubted my abilities.

internet, and weather monitoring.[1] Moreover, the several technological advancements of humankind allow us to continually explore space and expand the knowledge of our galaxy. However, since the launch of Sputnik, space-faring nations continue to congest space with satellites and spaceships as they push the boundaries of space exploration. Just as humans have wreaked havoc on the environment down on earth, they are currently wreaking havoc on the environment in space.

Orbital debris is any man-made object that is no longer functional, traveling in the Earth's orbit.[2] More than 500,000 trackable pieces of debris currently orbit the Earth, posing a serious threat to both astronauts and operational satellites.[3] Pieces of old satellites, nails, screws, and paint chips currently travel at speeds up to 17,500 mph in low earth orbit.[4]

Orbital debris continues to threaten human exploration of space just as it has in the past few decades. In 2009, the inactive Russian satellite Kosmos 2251 and the active U.S. communication satellite Iridium 33 collided, resulting in about 2,000 of pieces of orbital debris.[5] In 2015, three astronauts living at the International Space Station (ISS) hurriedly attempted to reach safety as orbital debris from another inactive Russian satellite made a "close pass" to the station.[6] In 2018, controllers at the European Space Agency had to quickly boost the $162 million CryoSat-2 spacecraft into higher orbit to avoid a collision with another piece of orbital debris.[7] Maneuvers like this are more frequent each year as the number of trackable pieces of space debris increases.[8]

Despite the recent coverage of orbital debris by the media, the issue of orbital debris and collisions first came to NASA's attention in 1970.[9] That year, derelict Delta rockets that were left in earth's orbit exploded, creating

1. *See generally* FRANCIS LYALL & PAUL B. LARSEN, SPACE LAW: A TREATISE, 1 (2d ed. 2018).

2. Mark Garcia, *Space Debris and Human Spacecraft*, NASA (Sept. 26, 2013), https://www.nasa.gov/mission_pages/station/news/orbital_debris.html.

3. Maya Wei-Hass, *Space Junk Is a Huge Problem-and It's Only Getting Bigger*, NAT'L GEOGRAPHIC (Apr. 25, 2019), https://www.nationalgeographic.com/science/space/reference/space-junk/.

4. *Id*.

5. *Id*.

6. *ISS Astronauts Dodge Flying Russian Space Debris*, PHYS ORG (July 16, 2015), https://phys.org/news/2015-07-iss-astronauts-dodge-russian-space.html.

7. Alexandra Witze, *The Quest to Conquer Earth's Space Junk Problem*, NATURE (Sept. 5, 2018), https://www.nature.com/articles/d41586-018-06170-1.

8. *Id.*

9. Judy Corbett, *Micrometeoroids and Orbital Debris (MMOD)*, NASA (June 14, 2016), https://www.nasa.gov/centers/wstf/site_tour/remote_hypervelocity_test_laboratory/micrometeoroid_and_orbital_debris.html.

a cloud of shrapnel in Earth's orbit.[10] However, it was almost a decade later that the orbital debris issue attracted the attention of scholars. In 1978, Donald J. Kessler and Burton G. Cour-Palais published a paper entitled "Collision Frequency of Artificial Satellites: The Creation of a Debris Belt."[11] Their work brought attention to the dangers of orbital debris and made the space community aware of an array of issues that may arise as a result of the increasing amount of orbital debris. Kessler and Cour-Palais explained that as humans continue to send satellites up into space, it increases the probability of collisions between active satellites and debris, which will in turn create more debris and more collisions.[12] In sum, they coined the term "Kessler Syndrome," which refers to the phenomenon that a chain reaction of collisions will make operating space technology extremely costly and dangerous because of this cascade effect.[13]

The increasing awareness and understanding of the harmful effects of orbital debris has led some space-faring nations to propose interesting solutions, including the use of lasers and harpoons to remove orbital debris, which broaches the issue of national security and dual-use weapons in space.[14] For example, China and Russia proposed using a space-based laser or a harpoon to clean up debris.[15] This raises the concern of countries covertly weaponizing space while holding themselves out as addressing the orbital debris crisis. The concern is that the harpoon or space-based laser can serve as a dual-use weapon, or an object that can be used both to remove orbital debris and damage another country's working satellite. Although the weaponization of space is prohibited by current space law,[16] the orbital debris issue allows willing countries to place dual-use weapons in space. This conflict could lead to heightened tensions internationally.

The threat that orbital debris poses to human life and functional satellites is serious and increasing. The more space-faring nations explore space, the more contaminated it becomes with defunct satellites and other useless space objects. This note will argue that, to prevent countries from covertly

10. *Id*.

11. James Alver et al., An Analysis of the Potential Misuse of Active Debris Removal, On-Orbit Servicing, and Rendezvous & Proximity Operations Technologies (May 6, 2018) (unpublished M.A. capstone, George Washington University) (on file with author).

12. *Id*.

13. *Id*.

14. Saadia Pekkanen, *Why Space Debris Cleanup Might be a National Security Threat*, PHYS ORG (Nov. 13, 2018), https://phys.org/news/2018-11-space-debris-cleanup-national-threat.html.

15. Avery Thompson, *China Wants to Use a Space Laser to Clean Up Space Junk*, POPULAR MECHS. (Jan. 16. 2018), https://www.popularmechanics.com/space/satellites/a15173781/china-wants-to-use-a-laser-to-clean-up-space-junk/.

16. *International Legal Agreements Relevant to Space Weapons*, UNION OF CONCERNED SCIENTISTS (Feb. 11, 2004), https://www.ucsusa.org/resources/legal-agreements-space-weapons.

weaponizing space with dual-use technology under the guise of addressing the orbital debris issue, space-faring nations must join forces to create and fund a neutral inter-governmental organization tasked with actively removing orbital debris, using the legal framework of the ISS as a model for the new organization. The construction and maintenance of the ISS has been largely successful, proving that international cooperation and funding for various space activities is possible, albeit difficult. A neutral inter-governmental organization would serve to address the environmental crisis occurring in Earth's orbit and to eliminate the need for individual countries to address the issue, which may potentially carry out ulterior motives.

## II. INTRODUCTION—DEFINITIONS AND CURRENT SPACE LAW

The term "space law" refers to the body of international law that governs activities in outer space, which is the zone that extends one hundred kilometers above Earth. The main treaties in space law are the Outer Space Treaty (the Treaty), formally known as the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, the Convention on International Liability for Damage Caused by Space Objects (the Liability Convention), the Convention on the Registration of Objects Launched into Outer Space (the Registration Convention), and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the Moon Agreement).[17] Many space law scholars have written about the Treaty, its ambiguity, and its failure to guide space-faring nations on the issue of orbital debris.

Moreover, although orbital debris is littered throughout outer space, the orbital debris issue exists mainly in low earth orbit (LEO), which mimics the orbit of the earth and has an altitude of up to 2,000 miles.[18] The term "in orbit" describes an object in motion around the center of the earth.[19] LEO has become a popular destination for satellites because of its low latency.[20] In simple terms, latency refers to the time it takes for data to be transmitted to earth from a satellite.[21] LEO's low latency makes it a hot spot for both military and commercial satellites.[22]

17. *Space Law Treaties and Principles*, U.N. OFF. FOR OUTER SPACE AFFS., https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html (last visited Dec. 15, 2021).

18. Greg Ritchie & Thomas Seal, *Why Low-Earth Orbit Satellites Are the New Space Race*, WASH. POST (July 10, 2020), https://www.washingtonpost.com/business/why-low-earth-orbit-satellites-are-the-new-space-race/2020/07/10/51ef1ff8-c2bb-11ea-8908-68a2b9eae9e0_story.html.

19. LYALL & LARSEN, *supra* note 1, at 153.

20. *Id*. at 153-54.

21. *Id.*

22. *Id.*

It is important to distinguish between the militarization and the weaponization of space. Although most people use the terms militarization and weaponization interchangeably, these words do not have the same meaning and pose very different implications. The militarization of space entails the use of space by military spacecraft, whereas the weaponization of space entails placing a device in the terrestrial environment, created to attack a man-made device.[23] This distinction is integral to understanding the national security issues that the space community is currently discussing. Weaponization may entail militarization, but militarization does not necessarily entail weaponization.[24] Further, several countries have militarized space with satellites which are used for reconnaissance and other military activities.[25]

Additionally, the growing concern of orbital debris gave rise to the issue of its removal, which turned into a national security threat. China and Russia, striving to solve this issue, proposed using a space-based laser or a harpoon to clean up debris.[26] This inevitably broached the subject of national security and dual-use technology in space.[27] The concern is that the same harpoon or laser that cleans up space debris can also shoot down or capture an adversary's functioning satellite.[28] In other words, the orbital debris crisis offers countries a chance to weaponize space under the guise of addressing the orbital debris problem, which is not something that the drafters of the Treaty could have foreseen.[29] To prevent countries from covertly weaponizing space, a neutral syndicate must be created to clean up orbital debris.

23. Sa'id Mosteshar, *Space Law and Weapons in Space*, OXFORD RES. ENCYC. OF PLANETARY SCI. (May 23, 2019), https://oxfordre.com/planetaryscience/view/10.1093/acrefore/9780190647926.001.0001/acrefore-9780190647926-e-74.

24. *Id*.

25. Meghan Bartels, *Space Has Always Been Militarized, Just Not Weaponized – Not Yet, Anyway*, SPACE.COM (Nov. 1, 2018), https://www.space.com/42298-space-weaponized-already-military-history.html.

26. Thompson, *supra* note 15.

27. Pekkanen, *supra* note 14.

28. *See id*.

29. Saadia Pekkanen, *The Hidden Danger of Cleaning Up Our Space Junk*, DAILY BEAST (Nov. 30, 2018, 9:50 PM), https://www.thedailybeast.com/the-hidden-danger-of-cleaning-up-our-space-junk.

### *A. Current Space Law—The Outer Space Treaty and More*

The launch of the Soviet Union's artificial satellite, Sputnik, in 1957 arguably started the great space race.[30] Sputnik's launch was a breakthrough in the human exploration of outer space. The launch offered hope for the limitless possibilities of space exploration, but it also instilled feelings of inferiority and insecurity in Americans.[31] Just a decade after the Cold War, Russia showcased its superiority in space.[32] The concern was that space, a neutral commons, would become another battle field for humanity.[33] This fear led to the creation of the UN ad hoc committee, the Committee on The Peaceful Uses of Outer Space in 1958.[34] Shortly after, the International Co-operation in the Peaceful Uses of Outer Space (Resolution 1472 XIV) was created.[35] Part XIV of the resolution emphasizes that the exploration of outer space should only be for peaceful purposes and for the betterment of mankind.[36] This emphasis echoed the fear of the militarization of outer space.[37] Moreover, Russia and the United States, the main space-faring nations, went further to prevent space from becoming a battlefield and created the Treaty in the early 1960s.[38] The Treaty would go on to serve as the primary legal framework of international space law.

The Treaty, formally known as the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, has become the primary source of space law. It was opened for signature in January 1967 and entered into force later that year.[39] Currently, 109 countries have ratified the Treaty, including the leading space-faring nations of the United States, China, and Russia.[40]

On its face, the Treaty appears to address many unanswered questions about the obligations and goals of space-faring nations, but a closer read

30. *Sputnik and The Dawn of the Space Age*, NASA, https://history.nasa.gov/sputnik/ (last visited Dec. 15, 2021).

31. Eleanor Imster & Deborah Byrd, *Today in Science: Launch of Sputnik*, EARTHSKY (Oct. 4, 2019), https://earthsky.org/space/this-date-in-science-launch-of-sputnik-october-4-1957.

32. *See id.*

33. *COPUOS History*, U.N. OFF. FOR OUTER SPACE AFFS., https://www.unoosa.org/oosa/en/ourwork/copuos/history.html (last visited Dec. 15, 2021).

34. *Id*.

35. *Id.*

36. G.A. Res. 1472 (XIV) A, International Co-operation in the Peaceful Uses of Outer Space, at 5 (Dec. 12, 1959).

37. *See* 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, 610 U.N.T.S. 205 [hereinafter OST].

38. *Id.*

39. *Id.*

40. LYALL & LARSEN, *supra* note 1, at 49.

reveals that the Treaty is quite ambiguous and incomplete. The preamble to the treaty reaffirms the importance of the peaceful exploration of outer space and international cooperation, similar to the International Co-operation in the Peaceful Uses of Outer Space resolution.[41] It is important to note that the treaty emphasizes, at least seven times, that the exploration of outer space shall be peaceful.[42] However, despite the Treaty's deceptively apparent promise to preserve space as a peaceful environment, it fails to deal with the growing concern of space weaponization.

In particular, Article 4 of the Treaty has been widely criticized as ambiguous and inadequate to address the growing concerns of the weaponization of outer space. Article 4 explicitly prohibits placing in Earth's orbit nuclear weapons or other weapons of mass destruction.[43] It also prohibits establishing military bases, fortifications, and testing weapons on any celestial body.[44] Furthermore, although the Treaty prohibits placing nuclear weapons and weapons of mass destruction in Earth's orbit, the ambiguous language of the treaty fails to encompass lasers, anti-satellite weapons, and land-based weapons that can cause irreparable damage in outer space. The Treaty also prohibits military fortifications and bases on celestial bodies but makes no mention of military fortifications and LEO bases.[45]

The Treaty also fails to explicitly discuss orbital debris and how to deal with it. In 2010, the UN Committee on the Peaceful Uses of Outer Space (COPUOS) recognized that orbital debris poses a threat to both spacecrafts and human life.[46] Consequently, it created guidelines for Member States to follow in order to mitigate the threat of orbital debris.[47] These guidelines include, inter alia, limiting debris during normal operations, minimizing the potential for break-ups during operational phases, and limiting the probability of accidental orbital collision.[48] However, the guidelines state that "[m]ember States and international organizations should voluntarily take [these] measures."[49] The guidelines go on to state that they "are applicable to mission planning and the operation of newly designed spacecraft and orbital stages and, if possible, to existing ones. They are not legally binding under

41. OST, *supra* note 37.

42. *Id.*

43. *Id.* art. 4.

44. *Id.*

45. *Id.*

46. Comm. on the Peaceful Uses of Outer Space, Rep. of the Legal Subcomm. on Its Fifteenth Session, U.N. Doc. A/AC.105/C.1/L.260 (2010).

47. *Id*. at 1-2.

48. *Id.*

49. *Id.*

international law."[50] Therefore, launching states may ignore the guidelines and potentially create orbital debris without consequence.

Similarly, the Inter-Agency Space Debris Coordination Committee created the IADC Space Debris Mitigation Guidelines in 2007.[51] These guidelines, compared to the COPUOS guidelines, lay out different measures that space-faring nations should take to reduce the amount of orbital debris in space. However, similar to the COPUOS mitigation guidelines, the IADC guidelines are not binding and merely encourage the participating nations to "apply [the] guidelines to the greatest extent possible."[52] Moreover, both the IADC and COPUOS guidelines focus on debris prevention, not removal.[53] Given that there are currently millions of pieces of debris orbiting the earth, it is apparent that mitigation is not enough to address the threat posed by the debris. Space-faring nations must begin to engage in active debris removal (ADR) instead of merely mitigating the harm. However, the current orbital debris crisis coupled with the Treaty's ambiguity leaves open the possibility that space-faring nations may weaponize space covertly, despite their previous attempts to prevent it.

### *B. Past International Efforts to Prevent Weaponization*

Over the past few decades, space-faring nations have made efforts to prevent the weaponization of space. In the early to mid-1980s the UN called on the Conference on Disarmament to create the resolution of the Prevention of an Arms Race in Outer Space (PAROS).[54] However, the United States refused to sign the treaty, claiming there was no need for it because, at the time, there were no weapons in space.[55] Shortly after, the committee on PAROS was dissolved.

Similarly, in 2008, Russia and China combined forces to propose a drafted treaty: The Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWOS).[56] The Minister of the Foreign Affairs of the Russian Federation at the time, Sergey

50. *Id.*

51. Inter-Agency Space Debris Coordination Comm. [IDAC], *IADC Space Debris Mitigation Guidelines* (2007), https://www.unoosa.org/documents/pdf/spacelaw/sd/IADC-2002-01-IADC-Space_Debris-Guidelines- Revision1.pdf.

52. *Id.* at 5.

53. *Id.*

54. G.A. Res. 62/20, Prevention of an Arms Race in Outer Space, at 2 (Dec. 5, 2007).

55. *Id.*

56. Joshua Pantesco, *Russia, China Propose Draft Treaty on Use of Weapons in Space*, JURIST (Feb. 12, 2008, 9:41 AM), https://www.jurist.org/news/2008/02/russia-china-propose-draft-treaty-on/.

Lavrov, expressed concern about the state of international space law because it "did not prohibit deployment in space of weapons other than weapons of mass destruction."[57]

The PPWOS treaty was extensive and laid out clear-cut definitions for critical terms. For example, the treaty defined a weapon in outer space as "any device placed in outer space, based on any physical principle, which has been specially produced or converted to destroy, damage or disrupt the normal functioning of objects in outer space, on the Earth or in the Earth's atmosphere, or to eliminate a population or components of the biosphere which are important to human existence or inflict damage on them."[58] By offering concrete definitions, the draft treaty aimed to correct much of the Treaty's ambiguity, but unfortunately, negotiations were stalled after the United States refused to sign the PPWOS treaty.[59]

However, even if the United States had signed the PPWOS treaty and the countries agreed to limit themselves, the treaty's definition of a weapon in space fails to encompass ground-based anti-satellite weapons (ASATs). ASAT's are a type of directed-energy weapon that destroys or interferes with working satellites and consequently prevents the country in ownership of the satellite from using it properly.[60] Considering the importance of satellites in military intelligence, the amount of harm an ASAT weapon can do to a working satellite is alarming. Moreover, the space-based laser that China proposed to clean up space debris is an ASAT weapon capable of destroying working U.S. and Russian satellites.[61]

When the Soviet Union first launched Sputnik I, there was no existing legal framework to govern outer space activities.[62] Before creating COPUOS, the countries assumed that the law that governed airspace would also govern outer space.[63] Currently, no body of law addresses the weaponization concerns of LEO. It is also important to note that the Treaty was written when

57. *Id.*

58. Letter dated 19 August 2008 from the Permanent Representative of the United States of America addressed to the Secretary-General of the Conference transmitting comments on the draft "Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT)" as contained in document CD/1839 of 29 February, U.N. Doc. CD/1847, at 4 n.3 (Aug. 26, 2008), https://undocs.org/CD/1847.

59. *See id.*

60. Carin Zissis, *China's Anti-Satellite Test*, COUNCIL ON FOREIGN RELS. (Feb. 22, 2007, 10:37 AM), https://www.cfr.org/backgrounder/chinas-anti-satellite-test.

61. *See* Matt Williams, *China Has a Plan to Clean up Space Junk with Lasers*, PHYS ORG (Jan. 17, 2018), https://phys.org/news/2018-01-china-space-junk-lasers.html.

62. MATTHEW J. KLEIMAN, THE LITTLE BOOK OF SPACE LAW (2013).

63. *Id.*

the main concern was nuclear weapons.[64] However, since 1967, space technology has advanced rapidly. The Treaty is arguably outdated due to its failure to prohibit the many types of firearms that countries may place in LEO today.

The unique issue of orbital debris, its removal efforts, and the shortcomings of current space law aligned to create the perfect storm. Today, any space-faring nation would be able to place a dual-use weapon in space under the guise of minimizing the threat of orbital debris.[65] Just last year, Chinese engineers at China's Air Force Engineering University published a paper detailing the feasibility of a space-based laser that can be used to address the issue of orbital debris.[66] They believe that the laser can blast large pieces of space debris into smaller pieces, making the pieces less harmful to humans and spacecraft in orbit.[67] Moreover, China plans to accomplish this by equipping a satellite with the laser.[68] This would effectively make the satellite a dual-use weapon. Although China was the first country to propose placing a laser in space to clean up debris, theoretically any country would be able to do so without violating the Treaty.[69] This would give adversarial countries an advantage in space by allowing them to damage working satellites belonging to another country, potentially leading to a war in space.

Additionally, China's proposal to use a laser to blast orbital debris into smaller pieces puts the fear of the weaponization of space into the spotlight. Because orbital debris is a pressing issue for all space-faring nations, it gives every nation, not just China, a chance to hold itself out as attempting to solve the issue while simultaneously weaponizing space with dual-use technology.[70] Similarly, under current international space law, any country would be able to place an ASAT dual-use weapon in space without violating the Treaty or other international agreements.[71] The growing threat of orbital debris, the potential weaponization of space, and ambiguous language of the Treaty raise several concerns for the future of the final frontier, and existing space law does little to address those concerns.

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64. Daryl Kimball, *The Outer Space Treaty at a Glance*, ARMS CONTROL ASS'N, https://www.armscontrol.org/factsheets/outerspace (last visited Dec. 23, 2021).

65. NAT'L AIR & SPACE INTEL. CTR., COMPETING IN SPACE, (Dec. 2018), https://media.defense.gov/2019/Jan/16/2002080386/-1/-1/1/190115-F-NV711-0002.PDF.

66. Joe Pappalardo, *Could a Chinese Space Junk Laser Double as a Weapon*?, POPULAR MECHS. (Jan. 17, 2018), https://www.popularmechanics.com/military/weapons/a15338238/china-space-junk-laser-weapon-potential/.

67. *Id.*

68. *Id.*

69. NAT'L AIR & SPACE INTEL. CTR., *supra* note 65.

70. Pappalardo, *supra* note 66.

71. Zissis, *supra* note 60.

## III. THE NEED FOR A NEUTRAL INTERGOVERNMENTAL ORGANIZATION

Right now, it is critical for space-faring nations to come together to create and fund a neutral intergovernmental organization (IGO) to safely remove orbital debris. There are several reasons why this is the best solution for the current orbital debris crisis. First and foremost, the IGO will directly address the orbital debris issue by actively removing orbital debris. Second, because the IGO will be created and funded by several nations it will eliminate the need for a single country to address the orbital debris issue on its own. For example, because the IGO will be an international effort to remove orbital debris, China, for instance, will have less of a reason to send a dual-use laser to space in order to blast large pieces of debris into smaller pieces. Because several space-faring nations in the past have indicated an interest to preserve space as a peaceful environment, dual-use weapons in space would likely raise tensions between countries and potentially lead to strained diplomatic relations. Third, the creation of the IGO will strengthen the diplomatic relations of the space-faring nations. Space has always been recognized as a neutral commons, owned by no one and open for exploration by anyone, like the sea. It is appropriate for the space-faring nations to unite and address the crisis in space together.

Some scholars argue against an intergovernmental organization, describing it as unnecessary and futile. Jie Long argues there is no need to create a costly intergovernmental organization that actively removes orbital debris, and that the solutions to our orbital debris problems are in the Treaty itself.[72] In particular, Long points to Article 9 of the Treaty which states:

> In the exploration and use of outer space… State Parties to the treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct their activities in outer space, including the Moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the treaty.[73]

Long argues that countries must do their due diligence and remove the orbital debris which results from their own activities so as to comply with the Treaty.[74] However, Long's argument fails due to the Treaty's ambiguity.

Long's argument could be successful if the Treaty contained clear and unambiguous guidelines for space-faring nations to follow. However, the language of the Treaty is far too ambiguous to encourage due diligence in removal of orbital debris. The language of the Treaty, not just in Article 9,

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72. Jie Long, *Ideas for Development of Long-Term Sustainability of Outer Space Activities: Active Space Debris Removal*, 48 H.K. L.J. 623, 635 (2018).

73. *Space Law Treaties and Principles*, *supra* note 17.

74. Long, *supra* note 72.

but all throughout, is ambiguous enough to allow countries to interpret it in their favor. Interpreting "with due regard to the corresponding interests of all other State Parties" as creating an obligation for countries to actively remove orbital debris is a forced reading of the Treaty.[75] Furthermore, the ambiguity and broad language of the Treaty does not give countries enough incentive to deorbit their satellites or to fund an active debris removal project.

Long's argument could succeed if countries that have ratified the Treaty held each other accountable for violating it. Although the language of the treaty is ambiguous, pressure from other countries to respect the shared environment of space may encourage the main space-faring nations to practice more awareness in regard to the orbital debris they leave behind, because otherwise, they would risk disrupting their foreign relations with powerful countries. However, given that the orbital debris crisis is gradually worsening, it is crucial that countries take a more active approach and create the IGO.

In addition to the new IGO's ability to actively remove orbital debris, it would also reduce the risk of the covert weaponization of space. For example, if each country funded the IGO through a tax, knowing that they are contributing to the removal of debris, the attempt of other countries to go around the IGO and use a space-based harpoon to clean up debris would raise concerns. In other words, the creation and operation of the IGO will make it unnecessary and less likely that countries will weaponize space with dual use weapons to clean up orbital debris, because there will be an entire international organization to take care of the clean-up. The IGO will make it more apparent if a country is trying to use the orbital debris crisis as an opportunity to weaponize space.

## IV. THE LEGAL FRAMEWORK OF THE INTERNATIONAL SPACE STATION

The ISS is celebrated as the apogee of international partnership.[76] The United States, Russia, China, Canada, and Europe (the Partners) are all part of the successful partnership.[77] Part of the success of the ISS is attributed to the Intergovernmental Agreement of 1998 (the 1998 Agreement). The 1998 Agreement offers a sophisticated and detailed legal framework of, inter alia,

75. *Space Law Treaties and Principles*, *supra* note 17.

76. Eric Mack, *At 20, the International Space Station Remains a Stellar Success Story*, CNET (Nov. 19, 2018, 11:32 AM), https://www.cnet.com/news/at-20-the-international-space-station-remains-a-stellar-success-story/.

77. *International Space Station Basics*, NASA (2007), https://www.nasa.gov/pdf/179225main_ISS_Poster_Back.pdf.

the management, operation, ownership, and funding of the ISS.[78] The law governing the creation, operation, and utilization of the Station can be divided into three categories: the 1998 agreement, the Memoranda of Understanding (MOU), and implementing agreements between the Partners.

The first and arguably most important category is comprised of the 1998 Agreement, which superseded the earlier 1988 agreement.[79] Article 1 of the 1998 Agreement emphasizes that the object of the Agreement "is to establish a long-term international cooperative framework among the Partners, on the basis of genuine partnership, for the detailed design, development, operation, and utilization of a permanently inhabited civil international Space Station for peaceful purposes, in accordance with international law."[80]

Moreover, the ISS is operated in accordance with all of the major space treaties, including the Outer Space Treaty.[81] The 1998 Agreement created a genuine partnership between the Partners and has proven to be successful in governing the activities of the ISS. Article 7 states that the Partners, acting through managing bodies, shall "plan and coordinate activities affecting the design and development of the Space State and its safe, efficient, and effective operating and utilization."[82] The Agreement also provides that each member state is responsible for managing its own programs.[83] The 1998 Agreement emphasizes that each Partner shall play a vital role in the operation and success of the ISS.

The second category of the law governing the ISS consists of the MOU. Although the 1998 Agreement lays out the basic legal framework of the Station, the MOUs are integral to the operation and utilization of the ISS. A MOU is less than a formal contract, but more than a simple agreement.[84] It is generally understood that MOUs are a type of soft law.[85] They "provide a

78. Rochus Moenter, *The International Space Stations: Legal Framework and Current Status*, 64 J. AIR L. & COM. 1033, 1048 (1999).

79. A. Farand, *The Space Station Cooperation Framework*, Legal Affairs, ESA (1998), http://www.esa.int/esapub/bulletin/bullet94/FARAND.pdf.

80. Agreement among the government of Canada, governments of Member States of the European Space Agency, the government of Japan, the government of the Russian Federation, and the government of the United States of America concerning Cooperation on the Civil International Space Station, Jan. 29, 1998, T.I.A.S No. 12, 927 at 3 [hereinafter 1998 ISS Agreement].

81. *See id.* at 2.

82. *Id.* art. 7.

83. *See id.*

84. *See* LYALL & LARSEN, *supra* note 1, at 33-34.

85. *See id.* at 50-52 (discussing how soft law cannot be enforced like formal hard law but provides a framework for countries to engage in space activities and exploration).

framework for cooperation and coordination" and "set forth broad guidelines describing the roles and responsibilities" of the parties to the MOU.[86]

MOUs have become increasingly popular over the past few decades and are extensively used by the Partners to the ISS, because they allow for cross-agency partnerships.[87] For example, after the Partners signed the 1998 Agreement, NASA entered into several MOUs with other major space agencies, including the European Space Agency (ESA) and the Russian Space Agency (RSA). Also, NASA and ESA entered into a MOU establishing that NASA will "assist in the on-orbit activation and performance verification of the flight elements provided by the Partners in accordance with agreed assembly, activation and verification plans" and "participate with ESA and the other partners in Space Station management mechanisms as provided in Articles 7 and 8, including the development of the Operations Management Plan and the Utilization Management Plan."[88]

In sum, a MOU can be an effective way for international agencies to reach agreements with each other and to establish each agency's rights and responsibilities to one another. The MOUs that the Partners of the ISS created have proven to be successful and no conflicts have arisen thus far.

The final category of the law governing the ISS consists of implementing agreements between the Partners. Article 4 of the 1998 Agreement states that the cooperating agencies shall enter into "implementing arrangements" with one another to carry out their obligations under the 1998 Agreement and MOU's.[89] It is understood that these arrangements between agencies are necessary to further cooperation on the Station, and the 1998 Agreement itself hints at this.[90] The 1998 Agreement, MOUs and agreements between partners, in addition to the success of the ISS demonstrate that space-faring nations are able to work together to use space peacefully. This in turn offers hope that the IGO will succeed after its inception because, similarly to the ISS, space-faring nations will be coming together to work towards the common goal of active debris removal.

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86. *Memoranda of Understanding,* NASA SPACE SCI. DATA COORDINATED ARCHIVE (Oct. 5, 2016), https://nssdc.gsfc.nasa.gov/archive/mou/.

87. *See* LYALL & LARSEN, *supra* note 1, at 37; *ESA and NASA Sign Memorandum of Understanding Cooperation in Space Transportation,* EUR. SPACE AGENCY (Sept. 14, 2009), http://www.esa.int/Enabling_Support/Space_Transportation/ESA_and_NASA_sign_Memorandum_of_Understanding_on_cooperation_in_space_transportation.

88. Memorandum of Understanding between NASA of the U.S. and the European Space Agency Concerning Cooperation on the Civil International Space Station art. 6, NASA-ESA, Jan. 29, 1998, T.I.A.S No. 12844.

89. 1998 ISS Agreement, *supra* note 80, art. 4.

90. *See* Farand, *supra* note 79, at 1.

## V. USING THE INTERGOVERNMENTAL AGREEMENT OF 1998 AS A MODEL FOR THE NEW INTERGOVERNMENTAL ORGANIZATION

Like the legal framework of the ISS, the creators of the new IGO should model the main agreement after the 1998 Agreement and use MOUs and implementing agreements as an operational template. The principal space-faring nations have already proven that they are willing to cooperate on a multinational level for the sake of science and exploration, which offers hope for the creation of the new IGO. Using the legal framework of the ISS to create the IGO will be crucial to its success given that the legal framework of the ISS is sophisticated and clear.

For instance, Article 16 of the 1998 Agreement creates a cross-waiver of liability.[91] The Partners agree to a cross-waiver of liability for damage arising out of "protected space operations," including the research, development, and operation of the ISS.[92] Further, the Partners effectively waive liability that may arise out of damage to the ISS, excluding willful misconduct.[93] Likewise, it would be essential to the operation of the IGO to include a cross-waiver of liability similar to the one in the 1998 Agreement to ensure that it can effectively remove orbital debris without the looming fear of liability. For example, if a defunct intact satellite were to be damaged during removal, the IGO would not be liable for it and would be immune from suits by the launching nation. Additionally, this waiver should operate under the assumption that nonoperational satellites in LEO are not of use to the launching nation.

Although the new IGO can look to the 1998 Agreement when modeling its cross-waiver of liability, it must take a more original approach when it comes to funding the organization. While the 1998 Agreement offers a detailed system of funding, the unique nature of orbital debris requires the IGO to take a different approach. Currently, the governments of the Partners fund the Station collectively.[94] Article 15 of the IGA reads "each Partner shall bear the costs of fulfilling its respective responsibilities under this Agreement, including sharing on an equitable basis the agreed common system operations costs or activities attributed to the operation of the Space Station as a whole, as provided in the MOUs and implementing arrangements."[95] The Station is unique in that each Partner nation owns a different part of the Station, and is therefore responsible for its funding.

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91. 1998 ISS Agreement, *supra* note 80, art. 16.
92. *Id.*
93. *Id.*
94. *Id.*
95. *Id.* art. 15.

However, to fund the IGO for orbital debris removal, a tax should be levied on each launch to space, including both governmental and non-governmental launches. Each nation that launches any kind of space object into orbit should pay an additional tax to fund the IGO. As a result, the nations that have the greatest presence in space will be the primary funders of the IGO. The funds would be used to jumpstart the new organization, to allow for the costly endeavor of debris removal, and also to allow for continued research of new technologies that could make debris removal more efficient. Furthermore, the tax would serve as a reminder to launching entities that earth's orbit is a valuable resource, and that the orbital debris crisis is alarming and worsening.

Some may argue that countries will not have enough incentive to create and enter the IGO to remove orbital debris. However, there are several benefits that will come from the inception of the IGO. First, the increased visibility of the threat of orbital debris should incentivize the main space-faring nations to engage in active debris removal. The current amount of debris is so great that it may very well damage their expensive satellites and harm their astronauts.[96] Second, creating a neutral syndicate to remove orbital debris can help calm the tensions between nations in light of the fear of the weaponization of space.[97] Third, the countries that would create and fund the new IGO could be rewarded with increased tracking abilities, allowing them to track both orbital debris and the space objects of other countries. The countries would have a greater presence in space while contributing to the solution for orbital debris. It would particularly work well for countries like India that do not have as great of a presence in space as Russia, China, or the United States.

## VI. OWNERSHIP OF DEBRIS

Arguably, the biggest legal challenge the IGO would face is the ownership of debris in space. Active debris removal may lead to conflict between countries under the Treaty and Registration Convention. The issue of ownership over orbital debris is complex, so this note will only discuss it to the extent necessary to analyze the problems that ownership can pose for the IGO.

96. *See* Long, *supra* note 72, at 627.

97. *See generally, China's Space Debris Cleanup May Be Cover Story for Arms Against U.S. Satellites, Pentagon Says*, JAPAN TIMES (Feb. 12, 2019), https://www.japantimes.co.jp/news/2019/02/12/asia-pacific/chinas-space-debris-cleanup-may-cover-story-arms-u-s-satellites-pentagon/.

Under Article 8 of the Treaty, when a State Party registers and launches an object into outer space, the State Party retains jurisdiction and control over the object "while in outer space or on a celestial body."[98] The launched object is entered into a registry so that countries can keep track of its ownership. The treaty does not specify when the ownership and jurisdiction over a launched object ceases. Therefore, the launching countries still own the defunct and nonoperational satellites currently orbiting the earth which disincentives other countries to actively remove their satellites from orbit.[99] As Melissa Kemper Force explains, "it is the eternal fidelity to the superiority to ownership rights that prevents threatened users from using ADR to ameliorate the danger posed by hazardous space objects."[100] Neither does the 1998 Agreement address the cessation of ownership. Since it expressly states that the Station will be run in accordance with the Treaty, it is clear that the IGA does not offer any solution for determining when the ownership over defunct satellites ceases.

A plausible argument is that the law of abandonment should be applied to orbital debris.[101] Given the severity of the contamination of LEO and the increasing risk of Kessler Syndrome, the IGO will have to adopt strict abandonment laws for scrap pieces of former space objects and for objects that cannot be identified under the registry. Moreover, the IGO should utilize MOUs to address the ownership issue of objects and satellites that have more value. More specifically, the members of the IGO should enter into a MOU that when an intact non-operational satellite is removed from earth's orbit by the IGO, it will identify the satellite through the registry and return it to the custody of the country that launched it.

Although all space objects are costly, which makes ADR more difficult, satellites in particular will be an issue for the IGO. Satellites are generally used for GPS tracking and telecommunications, but they are also used for reconnaissance.[102] Satellites store the information they collect in chips that

98. OST, *supra* note 37.

99. *See* Michael Listner, *Legal Issues Surrounding Space Debris Remediation*, SPACE REV. (Aug. 6, 2012), https://www.thespacereview.com/article/2130/1.

100. Melissa Kemper Force, *Active Space Debris Removal: When Consent Is Not an Option*, 29 AIR & SPACE LAWYER 13, 14 (2016) (discussing the problem with nonconsensual use of active debris removal).

101. Emily M. Nevala, *Waste in Space: Remediating Space Debris through the Doctrine of Abandonment and the Law of Capture*, 66 AM. UNI. L. REV. 1495, 1516 (2017) (noting that for a property to be abandoned, the owner must (1) perform a manifest act that (2) shows his or her intent to forsake the property and (3) the action and the intent must occur concurrently).

102. Satellite Reconnaissance: Secret Eyes in Space, SPACE RACE, https://airandspace.si.edu/exhibitions/space-race/online/sec400/sec400.htm (last visited Dec. 23, 2021).

are installed within them.[103] Therefore, some defunct satellites in space may contain sensitive information and it is likely that the launching nation does not want another nation to get a hold of the information on the satellite for a plethora of reasons.

This creates a hurdle for the IGO in its course of ADR. The sensitive information contained within the satellites would force the IGO to carefully go about removing and handling the satellites to avoid potential conflicts. Additionally, materials used to create satellites and other space objects are highly expensive and can most likely be recycled and repurposed.[104] Therefore, the IGO should give the launching state a chance to reclaim its property by attempting to locate the launching state and returning it to that state to the best of its abilities. The pressing issue of orbital debris and continued contamination of space gives rise to the need of skillful balancing removing orbital junk and respecting the property of the launching countries.

However, because it is important to reduce the burden on the newly created IGO, the MOU's that countries would enter into with one another should only apply to certain satellites. The countries that create the IGO should consult with one another and set a deadline for when the IGO shall be obligated to locate the owner of intact satellites and when a satellite becomes derelict and fit for automatic disposal. Some defunct satellites may orbit the earth for decades. Just recently, the $2.9 billion European satellite Envisat went silent and stopped responding.[105] Shortly after, the ESA announced that it will not recover the satellite, which is the size of a school bus, and instead leave it in earth's orbit.[106] It may very well remain there for 150 years as the ESA has expressed its intent to allow the satellite to spiral into the atmosphere and burn up on its own.[107] This is clearly not a viable option since it greatly contributes to the orbital debris issue. A satellite of such massive size may likely collide with other pieces of orbital debris and continue to create more pieces of debris. This situation will undoubtedly pose a threat to the lives of astronauts.

However, requiring the IGO to identify and return every satellite it collects would be a costly burden and it would slow down the ADR process. Due to the severity of the threat posed by orbital debris, countries should

103. Satellites: A Global View of Earth, NASA (Aug. 1996), https://www.nasa.gov/centers/langley/news/factsheets/Satellites.html.

104. *See* Jez Turner, *Space Junk: A Recycling Station Could be Cleaning Up in Earth Orbit by 2050*, THE CONVERSATION (July 26, .2019, 7:03 AM), https://theconversation.com/space-junk-a-recycling-station-could-be-cleaning-up-in-earth-orbit-by-2050-119787.

105. Mike Wall, *Huge Dead Satellite May Be Junk for 150 Years*, SPACE.COM (May 11, 2012), https://www.space.com/15640-envisat-satellite-space-junk-150years.html.

106. *Id.*

107. *Id.*

agree to remove and dispose of satellites without attempting to locate the owner if the satellite has been nonoperational and orbiting the earth as debris for more than a decade but less than fifteen years. It should be presumed that such satellites are derelict, so the IGO does not have to go through the process of locating and returning the satellite to the launching country forever, which drives up costs and inefficiency. This MOU will allow the IGO to actively remove orbital debris while still being respectful of the property of other Partners to the organization.

Aside from the liability concerns that may arise in removing space objects that belong to other countries, the IGO must also consider the problem of unidentifiable pieces of orbital debris. Unidentifiable pieces of orbital debris, whether they are pieces of defunct satellites or intact defunct satellites, should be disposed of and should not become a burden on the IGO. The unidentifiable pieces of debris should either by disposed of or recycled by the IGO, and the cost should be factored into the funding of the IGO. Whether the unidentifiable pieces are disposed of or recycled, the debris will be out of earth's orbit and will no longer pose a threat to humans and working satellites in space.

## VII. PRIVATE ACTORS IN SPACE

The growing American private space industry raises several legal questions about the liability of private actors and the role they play in the orbital debris removal. The private space industry revolutionized satellite usage and non-governmental exploration, making it cost-effective while still promising reliability.[108] Private space companies, also known as non-governmental space entities, are also gaining visibility because NASA recently entered into partnerships with companies like SpaceX and Boeing to fly astronauts to space.[109] It is generally understood that non-governmental entities in the United States must also conduct space activities in accordance with the Treaty.[110] However, the U.S. Congress recently passed the American Commerce Free Enterprise Act (the Act) which streamlines regulations for the licensing of space objects launched by private companies.[111]

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108. Michaels Sheetz, *How NASA Is Evolving Through Partnerships with Private Space Companies*, CNBC EVOLVE (Nov. 30, 2019, 9:59 AM), https://www.cnbc.com/2019/11/30/how-nasa-is-evolving-through-partnerships-with-private-space-companies.html.

109. *Id.*

110. FED. COMM. COMM'N, MITIGATION OF ORBITAL DEBRIS IN THE NEW SPACE AGE, FCC-CIRC1811-02, at 36 (Oct. 25, 2018), https://docs.fcc.gov/public/attachments/DOC-354773A1.pdf.

111. Jeff Faust, *House Passes Commercial Space Regulatory Bill*, SPACE NEWS (Apr. 25, 2018), https://spacenews.com/house-passes-commercial-space-regulatory-bill/; H.R. Res. 2809, 115th Cong. § 80102(a) (2018) (enacted).

The Act makes licensing and regulation for private entities simple and fast, with all licensing and approval granted by the Secretary of Commerce of the Office of Space Commerce.[112] The language of the Act raises concerns about the United States' willingness to prioritize commercial needs since it severely limits regulation of private entities. For example, the Act emphasizes that "United States citizens and entities are free to explore and use space, including the utilization of outer space and resources contained therein, without conditions or limitations."[113] The firm language of the Act reflects the United States' intention to hold commercialization and capitalism in superior regard over regulation and safeguards. Although the Act later explains that all activities shall be conducted in compliance with the Treaty, some are concerned about impact the Act may have on international space activities.

Mike Listner, the founder of Space Law and Policy Solutions, a private space consulting firm, believes that the Act could "create some unfavorable interpretation of international law—and set a bad example for other nations who are enacting private space activities."[114] Listner's concern likely stems from § 80103(2)(C) of the Act, which states that "the Federal Government shall not presume all obligations of the United States under the Treaty are obligations to be imputed upon U.S. non-governmental entities."[115] This provision shows the United States' intent to separate its own obligations under the Treaty from the obligations of private entities, implying that private companies may fail to conduct their space activities in compliance with the Treaty. However, Article 6 of the Treaty explicitly 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 non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty.[116]

The Treaty also emphasizes that the activities of non-governmental entities in outer space must be supervised and regulated by the appropriate State Party to the treaty. Therefore, the Act creates some friction with the Treaty because the United States is trying to relieve as many burdens as possible on private companies to make space more accessible. However, by

112. H.R. Res. 2809, 115th Cong. § 80102(a) (2018).

113. *Id.* § 2(b)(1).

114. Caroline Haskins, *Private Space Companies No Longer Have to Follow the Law*, OUTLINE (May 8, 2018), https://theoutline.com/post/4469/outer-space-treaty-commerce-free-enterprise-bill-spacex-blue-origin-boeing-lockheed-martin?zd=1&zi=tgzeqldt.

115. H.R. Res. 2809, § 80103(2)(C).

116. OST, *supra* note 37.

doing so, the U.S. is not only holding itself out to the international community as relieving itself of responsibilities, but it is also risking violating the Treaty. If a private space company conducts space activities that are not in compliance with the Treaty, the United States will be responsible for violating the Treaty.

Because the Act relieves much of the regulatory burdens and allows private entities to complete their registrations through the Office of Space Commerce, there will likely be an influx of satellites and space objects launched into space by private companies. Elon Musk, the billionaire behind the private space company SpaceX, recently launched sixty satellites into space.[117] This inevitably broaches a discussion about orbital debris. The fear is that the growing commercialization of earth's orbit by private companies will make Kessler Syndrome a reality sooner than anticipated.[118] Although, some may argue that the Act requires companies to submit a debris mitigation plan for space objects that they launch, it merely requires that the plan take into account best practices. It does little to combat the dangers of orbital debris, similarly to the voluntary mitigation guidelines laid out by the COPUOS.[119]

More importantly, the Act opens the door for private companies to weaponize space. According to section 80103(b)(3), if the Secretary of Commerce fails to approve or deny an application for licensing within 90 days, the application shall be automatically approved.[120] Considering that the Office of Space Commerce has only twelve staff members, it is inevitable that some space objects launched by non-governmental entities will be automatically approved without meeting the regulations and requirements set out by the Act.[121] Therefore, it is possible that a private company could launch a dual-use weapon to clean up orbital debris while covertly weaponizing space, with the help of the United States. In addition to the possibility of weaponization, private companies are taking up the precious resources of orbital space and increasing the threat of space collisions and the amount of orbital debris.

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117. Shannon Hall, *As SpaceX Launches 60 Starlink Satellites, Scientists See Threat to "Astronomy Itself,"* N.Y. TIMES (Nov. 11, 2019), https://www.nytimes.com/2019/11/11/science/spacex-starlink-satellites.html.

118. Tom Hoggins, *Fears Over Space Junk After Elon Musk Launches 60 Starlink Internet Satellites*, TELEGRAPH, (Nov. 12, 2019, 5:13 PM), https://www.telegraph.co.uk/technology/2019/11/12/fears-space-junk-elon-musk-launches-60-starlink-internet-satellites/.

119. H.R. Res. 2809, §80104(a)(1).

120. *Id.* §80103(b)(3).

121. *Staff & Contact Information*, OFF. OF SPACE COM., https://www.space.commerce.gov/about/staff-contact/ (last visited Dec. 18, 2021).

The commercialization of space by non-governmental entities adds another complex layer to the orbital debris issue. Private companies in the United States, backed by billionaires seeking to exploit the neutral commons of space, are now actively contributing to the contamination of earth's orbit. Other space-faring nations should not allow the United States to shirk its responsibilities under the Treaty by delegating commercialization and exploration tasks to private companies by relieving the regulatory burdens. Any space-faring entity, whether governmental or private, should contribute to ADR and should not be allowed to exploit the resources of space without paying a tax.

The IGO could reduce this tension between the Treaty and the Act by requiring that private space companies contribute to its funding. They would have to pay a tax for every launch that would fund the IGO directly. This would ensure that private actors do not get away with launching several satellites into space, using the valuable resources of earth's orbit, without contributing to its clean up. Therefore, the agreement that will govern the new IGO must incorporate obligations of non-governmental actors to ensure that they contribute to funding of orbital debris removal.

## VIII. CONCLUSION

Orbital debris poses a dire threat to working satellites and human beings in space. Several nations, and especially the United States, are heavily dependent on space for military reconnaissance and commercial activities, and that dependence shows no sign of fading in the near future. Each year more and more satellites and other space objects are launched into LEO, and most are not properly programmed to deorbit into the atmosphere and burn up. Therefore, space-faring nations must turn their efforts to active debris removal since mitigation efforts are doing little to reduce the hazards of orbital debris.

The best way to tackle this is to create a neutral international organization tasked with carrying out the operations of orbital debris removal. This circumvents the potential risk of one country weaponizing space under the guise of addressing the orbital debris issue. It also addresses the environmental crisis head on. The organization can use the legal framework of the ISS to create its own agreements.

Moreover, because non-governmental entities increase their presence in space each year, they should help fund the IGO so that they are not free to exploit outer space without contributing to its clean-up. If more countries follow in the U.S.'s footsteps and relieve non-governmental entities of administrative and regulatory burdens, the space race and the increase of orbital debris will progress rapidly.

The time has come to take an active approach to debris removal. Mitigation efforts have fallen short of decreasing the amount of debris in orbit, and if space-faring nations do not act now, they may no longer be able to use space for daily activities and military reconnaissance in the future. However, to preserve space as a neutral environment, no single country should be able to take debris removal upon itself. Orbital debris is an issue that affects all space-faring nations, so all space-faring nations should enter into a partnership, akin to the IGA, to establish the guidelines and processes for safe debris removal.

Lastly, the IGO need not operate forever since it is a remedial measure. It may operate for as long as it is necessary to rid LEO of enough space debris to make it a safer and less costly place to operate. The amount of funds spent on the IGO now will be far less than what nations will have to spend in the future, if and when Kessler Syndrome becomes a reality.