

Celestial Ceiling or Humanitarian Abyss?: The Complexities of Applying International Humanitarian Law to Outer Space

Dana Ann Lucas*

*As outer space evolves from a domain of exploration to a potential theater of military operations, this Article addresses the critical legal gaps at the intersection of international humanitarian law (IHL) and space law regimes. This Article identifies unique challenges in applying traditional IHL principles to orbital conflicts, particularly regarding the classification of dual-use space objects and the enduring consequences of space debris. After examining the inadequacies of conventional interpretive methods such as *lex specialis*, this Article proposes a novel application of systemic integration pursuant to the Vienna Convention on the Law of Treaties. This methodological approach enables harmonization between IHL's humanitarian protections and the Outer Space Treaty's commitment to peaceful uses, providing a coherent framework for assessing military activities in space. Beyond theoretical analysis, this Article demonstrates how this approach would operate in practice through a case study of the proportionality principle in space-based conflicts. The framework developed herein offers a balanced solution that respects both immediate humanitarian concerns and the long-term interests of all states in preserving access to space.*

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* © 2026 Dana Ann Lucas, B.A., J.D., LL.M., Practicing Attorney in the areas of Intellectual Property and Technology, Canada. Bar Admissions: Saskatchewan Provincial Bar, Alberta Provincial Bar. Education: Master of Laws in Technology Law and Policy, Georgetown University Law Center (2025), Juris Doctorate, Distinction, University of Saskatchewan College of Law (2023), Bachelor of Psychology, Great Distinction, University of Saskatchewan (2023), Certificate in Strategic Space Law, Centre for Research in Air and Space Law, McGill University (2022).

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Space superiority is the future of warfare. We cannot win a war without controlling the high ground, and the high ground is space.

—General Lance W. Lord, (Former) Air Force Space Command Commander

I. INTRODUCTION

In the art of war, all armies prefer the high ground.¹ Since the beginning of the space era, nation states have recognized the strategic potential of outer space, intertwining with the exploration and military use thereof. While the dawn of space exploration brought hopes of scientific discovery and advancements for all humankind, it also coincided with the utilization of space technologies for military purposes.² With global tensions rising, particularly during the Cold War, space became yet another arena for strategic competition between state superpowers. Recognition of the military dimension of space exploration spurred the development of international legal frameworks seeking to regulate activities and prevent a full-blown arms race in this new frontier.³ However, the extent of the permissible scope of military activities in space has remained ambiguous in governing international outer space frameworks, allowing for a continued military presence. As such, there is an ongoing concern regarding the potential for space to become the next key battlefield.

1. SUN TZU, *THE ART OF WAR* 34 (Lionel Giles trans., Allandale Online Publ'g 2000).

2. Richa Maria & Shagnik Mukherjea, *International Humanitarian Law and Its Application to Armed Conflicts in Outer Space*, RSSR EDITOR'S COLUMN SERIES BLOG (Sep. 5, 2023), <https://www.rsrr.in/post/international-humanitarian-law-and-its-application-to-armed-conflicts-in-outer-space>.

3. *Id.*

In November 2019, the North Atlantic Treaty Organization (NATO) declared outer space to be its fifth operational domain.⁴ While space assets and services have been involved in military operations for decades, its ancillary nature to actual conflict fought on Earth has sectioned outer space as a supportive role, rather than a main stage. However, modern-day conflict no longer remains confined to the geographical areas contiguous to the global population. In this new “theatre of military operations,”⁵ actions demonstrate that the main military powers are shifting to the operational opportunities offered by higher altitudes. The shift away from a terrestrial spectrum, as the use of force in, or at least from, outer space, generates ambiguities within the legality of armed conflicts. IHL is a body of law that seeks to limit the effects of an armed conflict.⁶ Aiming to protect people who are not, or no longer, participating in hostilities, IHL regulates the means and methods of warfare, irrespective of the legality concerning the resort to force. Alternatively, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (OST) is a cornerstone of international space law.⁷ Founded in 1967, the OST established the framework for the peaceful exploration and use of outer space, emphasizing that space activities should benefit all countries.⁸ The intersection of these two fields of law regulating activities in outer space has led to questions on permissible and impermissible actions during times of armed conflict.

First, this Article provides a brief overview of IHL and its core principles, followed by a discussion of the OST’s role in space activities. Second, the application of these legal frameworks is provided in the event of an armed conflict in outer space. Third, areas of opacity in applying IHL to outer space are discussed. Afterwards, having identified IHL and space laws relevant to when an armed conflict takes place in outer space, this Article discusses reconciling these inconsistencies. This section first addresses how the application of the traditional interpretative principle of *lex specialis* in normative contexts is insufficient to resolve the complex issues in the outer space domain. As a more appropriate way to

4. *Id.*

5. THOMAS LECLERC, SPACE LAW: LEGAL FRAMEWORK FOR SPACE ACTIVITIES 341 (Wiley 2023).

6. *What Is International Humanitarian Law*, INT’L COMM. OF THE RED CROSS 1 (Mar. 7, 2022), <https://www.icrc.org/en/document/what-international-humanitarian-law>.

7. *Id.*

8. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, opened for signature Jan. 27, 1967, entered into force Oct. 10, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter OST].

reconcile the “on face value” challenging provisions and obligations of each section of law, this Article proposes the need to harmonize these international legal frameworks through systemic integration, followed by fostering transparency and confidence-building mechanisms. In summary, this Article examines the intersection of IHL and the OST in governing military activities in outer space during an armed conflict, analyzing the difficulties and potential solutions to ensure the protection of humanity in this increasingly contested domain.

II. LEGAL BACKGROUND

This section provides a foundational overview of the legal frameworks governing armed conflict and outer space activities, particularly where these domains intersect. The first section outlines the general principles of IHL, detailing its historical development, core treaties, and fundamental principles like distinction, proportionality, humanity, and military necessity that govern the conduct of armed conflict. The second section focuses on outer space law during peacetime, tracing its emergence through Cold War dynamics and key treaties, such as the OST and its successors, that emphasize the peaceful exploration and non-militarization of outer space. The third section explains the overlap between these two legal regimes, emphasizing that IHL continues to apply during armed conflict in or through outer space, ensuring that warfare in this new domain is still governed by established humanitarian rules and legal constraints.

A. *The Law of Armed Conflict*

Up until the end of World War I, resorting to armed force was regarded as a legitimate means to settle disputes, rather than an illegal act.⁹ The devastation and scale of World War I led to a growing recognition to establish a legal framework to prevent and control such atrocities.¹⁰ In 1919, the Covenant of the League of Nations formed the basis for an international organization to foster international cooperation and peace, with the goal to prevent future wars.¹¹ In 1928, the Treaty of Paris (also

9. *International Humanitarian Law: Answers to Your Questions*, INT'L COMM. OF THE RED CROSS (Dec. 2014), <https://www.icrc.org/en/publication/0703-international-humanitarian-law-answers-your-questions>.

10. SCOTT STRAUS, *FUNDAMENTALS OF GENOCIDE AND MASS ATROCITY PREVENTION* 2 (2016).

11. The Covenant of the League of Nations was integrated into the Treaty of Versailles and became effective in 1920. *See* Covenant of the League of Nations, June 28, 1919, 1 L.N.T.S. 3.

referred to as the Kellogg-Briand Pact) sought to outlaw war, renouncing it as a tool of national policy with signatory nations committing to peaceful dispute resolution.¹² However, these efforts to prevent war ultimately proved unsuccessful in averting the rise of militarism and the outbreak of World War II. It was not until 1945 that the adoption of the United Nations Charter confirmed that “[a]ll Members shall refrain in their international relations from the threat or use of force . . .”;¹³ this text is widely perceived today as customary international law (CIL) binding upon all states.¹⁴ That said, the U.N. Charter maintains a state’s right to individual or collective self-defense in response to aggression from another state or group thereof.¹⁵

In the nineteenth century, the codification of IHL arose through the adoption of the 1864 Geneva Convention for the Amelioration of the Condition of the Wounded in Armies in the Field and the 1868 Declaration of Saint Petersburg, which prohibited the use of certain projectiles in wartime.¹⁶ Today, there are two main treaty-based sources of IHL. The first branch of IHL is known as the “Law of Geneva” which refers to the body of rules protecting victims of armed conflict, including military personnel who are *hors de combat* and civilians who are not, or no longer, directly participating in hostilities.¹⁷ The second branch is the “Law of the Hague,” which refers to the body of rules that establishes the rights and obligations of belligerents in conducting hostilities, limiting the means and methods of warfare.¹⁸ Both these branches draw their names

12. General Treaty For the Renunciation of War (Kellogg-Briand Pact), Aug. 27, 1928, 46 Stat. 2343, 94 L.N.T.S. 57.

13. Charter of the United Nations Art. 2, ¶ 4, June 26, 1945, 1 U.N.T.S. XVI (entered into force Oct. 24, 1945) [hereinafter U.N. Charter].

14. G.A. Res. 2625 (XXV), ¶ 1 (Oct. 24, 1970); *See also Military and Paramilitary Activities in and Against Nicaragua* (Nicar. v. U.S.), Judgment, 1986 I.C.J. 14 (June 27); *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*, Advisory Opinion, 2004 I.C.J. 136, ¶ 87; THE CHARTER OF THE UNITED NATIONS: A COMMENTARY 13 (Bruno Simma et al. eds., 3d ed. 2012); YORAM DINSTEIN, WAR, AGGRESSION AND SELF-DEFENSE 87 (5th ed. 2011); CHRISTINE GRAY, INTERNATIONAL LAW AND THE USE OF FORCE 32 (4th ed. 2018).

15. U.N. Charter, *supra* note 13, at art. 51. (Together, Article 2(4) and Article 51 regulate the use of unilateral force. Article 51 outlines that unilateral force can only be used so long as the U.N. Security Council does not take any collective enforcement measures to address the situation. Acting on the basis of Chapter VII of the U.N. Charter, the U.N. Security Council may decide to resort to the collective use of force in response).

16. *What Is International Humanitarian Law*, *supra* note 6, at 1.

17. *Summary of the Geneva Conventions of 1949 and Their Additional Protocols*, AM. RED CROSS (Apr. 2011), https://www.redcross.org/content/dam/redcross/atg/PDF_s/International_Services/International_Humanitarian_Law/IHL_SummaryGenevaConv.pdf.

18. Convention (II) with Respect to the Laws and Customs of War on Land and Its Annex: Regulations Concerning the Laws and Customs of War on Land, July 29, 1899, The Hague, S.

from their cities of initial codification. Alongside these treaties, CIL maintains an important source of IHL to fill in the gaps where treaties are inapplicable (e.g., a lack of ratification or criteria of treaty application not fulfilled) or where the law is less developed.¹⁹ Formed through general state practice accepted as law, customary IHL binds all states, and all non-state parties, in a non-international armed conflict.

Since the ratification of the first Geneva Convention on August 22, 1864, the Geneva Conventions and their Additional Protocols have been the primary legal instruments for safeguarding non-combatants against the effects of hostilities.²⁰ The treatment of injured soldiers and medical workers who are not actively engaged in hostilities against a party is covered by the first Geneva Convention (i.e., the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field).²¹ The first Geneva Convention's provisions for naval forces and shipwrecked troops were expanded to include them under the second Geneva Convention (the Amelioration of the Condition of Wounded, Sick, and Shipwrecked Members of Armed Forces at Sea).²² The third Geneva Convention (the Treatment of Prisoners of War), which governs the treatment of prisoners of war, establishes guidelines and standards of care. Lastly, the fourth Geneva Convention (the Protection of Civilian Persons in Time of War) extends the rights already provided to ailing and injured soldiers to include civilians against cruel treatment and attacks.²³ IHL centers on the conduct of hostilities and the treatment of those impacted by war, protecting civilians, prisoners of war, medical personnel, and other groups of individuals not taking part in hostilities.

While the Geneva Conventions focus on the protection of war victims, the Law of the Hague primarily concerns itself with the rights and duties of belligerents during armed conflict. Per Article 22 of the Hague Regulations, "the right of belligerents to adopt means of injuring

Exec. Doc. Q, 56-1 (1900); *See generally* Convention (IV) Respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land. Oct. 18, 1907, The Hague, S. Exec. Doc. I, 60-1 (1908) [hereinafter Hague Convention (IV)].

19. *What Is International Humanitarian Law*, *supra* note 6, at 3.

20. THE ENCYCLOPEDIA OF WAR, (Gordon Martel ed., 2011).

21. Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, Aug. 12, 1949, 6 U.S.T. 3316, 75 U.N.T.S. 135.

22. Geneva Convention for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea, Aug. 12, 1949, 6 U.S.T. 3217, 75 U.N.T.S. 85.

23. Geneva Convention to the Treatment of Prisoners of War, Aug. 12, 1949, 6 U.S.T. 3316, 75 U.N.T.S. 135; *See also* Geneva Convention Relative to the Protection of Civilian Persons in Time of War, Aug. 12, 1949, 6 U.S.T. 3516, 75 U.N.T.S. 135.

the enemy is not unlimited.”²⁴ The general and fundamental principles central to attaining this aim include the core principles of humanity, distinction, proportionality, and military necessity. The principle of humanity imposes certain limits on the means and methods of warfare, requiring those fallen into enemy hands to be treated humanely.²⁵ The principle of distinction provides that each party to an armed conflict must distinguish between civilians and combatants, and between civilian objects and military objects; military operations are to only be directed at military objectives.²⁶ Specifically, indiscriminate attacks, means, and methods of warfare are prohibited.²⁷ The principle of proportionality requires that the impact of the means and methods of warfare employed not be disproportionate to the military advantage sought.²⁸ Lastly, the principle of military necessity prohibits superfluous injury and unnecessary suffering.²⁹ These principles seek to impose limits on the destruction of suffering caused by armed conflicts.

Today, the term IHL is considered synonymous with the law of armed conflict and the law of war, all of which refer to the modern-day understanding of *jus in bello*—the laws that govern the conduct of warfare.³⁰ The International Committee of the Red Cross (ICRC) is recognized to have a special relationship with IHL as its protector and advocate. Essentially, at the core of IHL are two fundamental purposes: (a) to protect persons who are not, or no longer, participating in hostilities and (b) to limit the means and methods of war during hostilities.³¹ Regulating relations amongst states, international organizations, and other subjects of international law, this branch of public international law consists of both international treaty and customary rules (i.e., rules arising from state practice and followed out of a sense of obligation) specifically meant to resolve humanitarian issues arising directly from armed

24. Hague Convention (IV), *supra* note 18.

25. Int’l Comm. of the Red Cross, *The Principles of Humanity and Military Necessity* 1-2 (Mar. 2023), https://www.icrc.org/sites/default/files/wysiwyg/war-andlaw/02_humanity_and_necessity-0.pdf.

26. Customary International Humanitarian Law Rule 1 (Int’l Comm. of the Red Cross).

27. Int’l Comm. of the Red Cross, *Distinction, How Does Law Protect in War?* (Casebook), https://casebook.icrc.org/a_to_z/glossary/distinction.

28. Int’l Comm. of the Red Cross, *Proportionality, How Does Law Protect in War?* (Casebook), <https://perma.cc/6T68-CHV5>.

29. Int’l Comm. of the Red Cross, *Military Necessity, How Does Law Protect in War?* (Casebook), <https://perma.cc/29CY-QKNK>.

30. Ryan Esparza, *Event Horizon: Examining Military and Weaponization Issues in Space by Utilizing the Outer Space Treaty and the Law of Armed Conflict*, 83 J. AIR L. & COM. 333 (2018).

31. Juan Felipe Idrovo Romo, *Armed Conflicts in Outer Space: Applicability and Challenges of International Humanitarian Law*, 7 USFQ L. REV. 335, 343 (2020).

conflicts, whether of an international or a non-international character.³² IHL applies equally to all sides of a conflict, irrespective of the reasons for the conflict or the justness of the causes for which they are fighting.³³ Importantly, the applicability of IHL is not extended to mere internal tensions or disturbances that constitute isolated acts of violence.

B. *Treaties Governing Outer Space*

Akin to other branches of public international law, space law has its origins rooted in the need to establish rules to govern the relations between an increasingly organized international community, particularly states.³⁴ As the human population began to turn their minds to the space enveloping Earth, no legal dimension existed in this sphere. Through the appearance of new and emerging technologies, in particular the development of rocket technologies during World War II, legal thinking on this matter grew more prevalent.³⁵ As early as the 1930s, Vladimir Mandl, one of the many early writers on space law, noted that the advancement of rockets into outer space would spur a rise of new issues not yet settled by air law and likely require a new legal regime.³⁶ Through the proliferation of the issue in 1958 by the International Geophysical Year, several authors began to turn their minds to this issue, including Eugene Pépin,³⁷ John Cobb Cooper,³⁸ Charles Chaumont,³⁹ and Nicolas

32. *What Is International Humanitarian Law*, *supra* note 6, at 3.

33. MICHAEL BYERS, *WAR LAW: UNDERSTANDING INTERNATIONAL LAW AND ARMED CONFLICT* 115 (2005).

34. Ma Xinmin, *The Development of Space Law: Framework, Objectives and Orientations*, at 3 (Keynote Address at the United Nations/China/APSCO Workshop on Space Law, Beijing, China, Nov. 17, 2014), <https://www.unoosa.org/documents/pdf/spacelaw/activities/2014/splaw2014-keynote.pdf>.

35. Vladimír Kopal, *Origins of Space Law and the Role of the United Nations*, in *OUTER SPACE IN SOCIETY, POLITICS AND LAW* 221 (Christian Brünner & Alexander Soucek eds., 2011); *See also* STEPHEN E. DOYLE, *ORIGINS OF INTERNATIONAL SPACE LAW AND THE INTERNATIONAL INSTITUTE OF SPACE LAW OF THE INTERNATIONAL ASTRONAUTICAL FEDERATION* 4 (2002).

36. Vladimír Mandl, *DAS WELTRAUM-RECHT: EIN PROBLEM DER RAUMFAHRT* 48 (1932); *See* Stephen Doyle, *Vladimir Mandl*, in *PIONEERS OF SPACE LAW* 57 (Stephen Hobe ed., 2013); *See also* NANDASIRI JASENTULIYA, *SPACE LAW: DEVELOPMENT AND SCOPE* 18-19 (1992).

37. *See for example*, Eugene Pépin, *Legal Problems Created by the Sputnik*, Lecture to the Canadian Bar Ass'n (Quebec Maritime & Air Law Section, Nov. 6, 1957), reprinted in *Legal Problems of Space Exploration: A Symposium* 187 (1961); *see also* Eugene Pépin, *Introduction to Space Law*, 4 N.Y. L. F. 1, 258-261 (1958); *see also* Eugene Pépin, *The Legal Status of the Airspace in the Light of Progress in Aviation and Astronautics*, 3 MCGILL L.J. 70, 70-77 (1956).

38. JOHN COBB COOPER, *EXPLORATIONS IN AEROSPACE LAW: SELECTED ESSAYS BY JOHN COBB COOPER 1946-1966* 298 (I.A. Vlasic ed., 1968); *See also id.* at 308.

39. *See for example*, CHARLES CHAUMONT, *LES PROBLÈMES DU DROIT INTERNATIONAL DE L'ESPACE EXTRA-ATMOSPHÉRIQUE* 3 (Institut des Hautes Études Internationales de l'Université de

Matte.⁴⁰ However, none of the writers could yet produce the international legal regime they called for.

Ultimately, geopolitical considerations drove the need for a new branch of international law; the competition and possible confrontation of the two state superpowers of the day—the United States and the Soviet Union—led each state to be in search of new fields where political, military, or technological advantage over the adversary could be obtained.⁴¹ Particularly, military technology was the foremost area of competition and the rapid development of nuclear arms signaled an exploration of all possible avenues in the Cold War confrontation.⁴² The Soviet Union's Sputnik launch in 1957 unexpectedly opened space as a new arena for U.S.-Soviet competition.⁴³ Instead of a space-based arms race, these states engaged in a different competition focused on human spaceflight and lunar landings, likely due to political and significant economic considerations such as high costs and immature technology.⁴⁴ By 1963, the U.S. and the Soviet Union had already agreed to prohibit deploying nuclear and other weapons of mass destruction in outer space, a bilateral agreement later endorsed by the U.N.⁴⁵

Following the establishment of general understandings to limit weapons in space, the U.N. General Assembly Resolution 1962 (XVIII) outlined principles for the peaceful exploration and use of outer space, paving the way for broader agreements.⁴⁶ This resolution subsequently led to the negotiation and signing of the OST in January 1967 in London, Moscow, and New York.⁴⁷ Today, the United Nations Office for Outer Space Affairs (UNOOSA) defines space law as “the body of law

Paris, 1958); see also Charles Chaumont, *Les Perspectives que Doit Adopter le Droit de l'Espace*, 7-2 REVUE DE DROIT CONTEMPORAIN 5-12 (1960); Charles Chaumont, *Die Brüssler Entschließung des Institut de Droit International zum Weltraumrecht*, 15 ZEITSCHRIFT FÜR LUFT-UND WELTRAUMRECHT 20-25 (1966).

40. NICHOLAS MATTE, AEROSPACE LAW n.38 (1969); see also Nicolas Mateesco Matte, *The Law of the Sea and Outer Space: A Comparative Survey of Specific Issues*, 3 OCEAN Y.B. 13 (1982).

41. Peter Jankowitch, *The Background and History of Space Law*, HANDBOOK OF SPACE LAW 3 (Frans G. von der Dunk & Fabio Tronchetti eds., 2017).

42. *Id.*

43. See generally David A. Koplow, *The Fault Is Not in Our Stars: Avoiding an Arms Race in Outer Space*, 59 HARV. INT'L L.J. 331 (2018).

44. See Jankowitch, *supra* note 41.

45. See Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, Aug. 5, 1963, T.I.A.S. No. 5433, 480 U.N.T.S. 43; See also G.A. Res. 1884 (XVIII) (Oct. 17, 1963).

46. See G.A. Res. 1962 (XVIII) at 37 (Dec. 13, 1963).

47. See OST, *supra* note 8.

governing space-related activities.”⁴⁸ A considerably wide definition, space law can and has been interpreted to not only regulate activities occurring physically in space, but also those related to space activities generally (e.g., the development of weapons of mass destruction on Earth meant to be put in orbit).⁴⁹ Of note, there is no single internationally agreed upon boundary that definitively determines where airspace ends, and outer space begins.⁵⁰ That said, this lack of consensus did not prevent the construction of international legal instruments to form the foundation of what is known as space law today.

While geopolitical factors were the primary driving force behind the international community's desire to reach broad agreements during a period of significant global tension and disagreement, other elements have facilitated progress and been incorporated in this area of law. Collectively referred to as *corpus juris spatialis*, the body of law governing space entails five core treaties developed by the Committee on the Peaceful Uses of Outer Space (COPUOS).⁵¹ These treaties strive to establish a framework for the peaceful exploration and utilization of outer space for the benefit of all humankind. This goal is evident in its provisions that promote international cooperation,⁵² shared access,⁵³ non-appropriation,⁵⁴ and the restriction of placing weapons of mass destruction

48. Space Law, United Nations Office for Outer Space Affairs, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/index.html>.

49. ALMUDENA AZCÁRATE ORTEGA & VICTORIA SAMSON, LEXICON FOR OUTER SPACE SECURITY (UNIDIR, 2023) (for example, “[m]ilitarization of outer space refers to any military activity in outer space (whether hostile or not, or whether weapons-related or not) or any activity that supports military operations. Many argue that outer space has been militarized since the early days of space exploration, thus highlighting that military uses of space are not necessarily aggressive or hostile in nature, and therefore can be considered to be acceptable under the umbrella of peaceful purposes. It is generally understood that the concept of militarization of outer space must be distinguished from the concept of weaponization of outer space. This distinction, however, is not universally accepted, as a number of States argue that, due to the nature of space objects and the space environment, it is not possible to develop a meaningful definition of a space weapon. Moreover, it is important to note that there are languages which do not have a word for weaponization. In those instances, the word ‘militarization’ is often used to refer to both of these ideas, which can create further confusion.”).

50. Jonathan C. McDowell, *The Edge of Space: Revisiting the Karman Line*, 151 ACTA ASTRONAUTICA 668, 668 (2018).

51. Dennison A. Butler, *Who Owns the Moon, Mars, and Other Celestial Bodies: Lunar Jurisprudence in Corpus Juris Spatialis*, 82 J. AIR L. & COM. 505, 506-507 (2017) (explanation of *corpus juris spatialis*).

52. See OST, *supra* note 8, at arts. VI, X.

53. *Id.* at art. I.

54. *Id.* at art. II.

in outer space.⁵⁵ Nonetheless, the timing of its drafting amid the Cold War remains significant in the provisions and as such, there was (1) a clear desire to prevent the extension of conflicts on Earth, particularly those of nuclear nature, into outer space and (2) an aim to preserve outer space as a global commons for all states.⁵⁶

During the twelve-year period that trailed the entry into force of the OST, four other major space treaties were concluded at the U.N.⁵⁷ In 1968, the Agreement on the Rescue of Astronauts, the Return of Astronauts and Return of Objects Launched into Outer Space (Rescue Agreement) was finalized and signed quickly.⁵⁸ This was accelerated by a tragic space event that occurred on the day the OST was signed.⁵⁹ In 1972, the Convention on International Liability for Damage Caused by Space Objects (Liability Convention) established crucial principles regarding international responsibility for damage caused by space objects, introducing the concept of absolute liability for damage on Earth and liability based on fault for damage elsewhere.⁶⁰ The 1975 Convention on the Registration of Objects Launched into Outer Space (Registration Convention) was further implemented, focusing on the registration of objects launched into outer space, a measure outlined in Article VIII of the OST.⁶¹ Finally, the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement) elaborated on several OST principles and addressed the status of the moon's natural resources as the "Common Heritage of Mankind."⁶² Notably though, this treaty only has eighteen party states (none of which includes major spacefaring nations currently).

While the last treaty was drafted over forty years ago and with limited ratification, efforts by international bodies to build multilateral rules for this new dimension of human activity did not wholly cease. The U.N. proceeded to move towards declaring legal principles for space by resolutions of the General Assembly, a practice previously employed in

55. *Id.* at art. IV.

56. *See* Jankowitch, *supra* note 41.

57. UNITED NATIONS TREATIES AND PRINCIPLES ON OUTER SPACE VI (2002).

58. 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.

59. John Uri, *55 Years Ago: Tragedy on the Launch Pad*, NASA (Jan. 27, 2022), <https://www.nasa.gov/history/55-years-ago-tragedy-on-the-launch-pad/>.

60. Convention on International Liability for Damage Caused by Space Objects, Nov. 29, 1971, 24 U.S.T. 2389, 961 U.N.T.S. 187.

61. Convention on Registration of Objects Launched into Outer Space, Nov. 12, 1974, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter Registration Convention].

62. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 5, 1979, 18 I.L.M. 1434, 1363 U.N.T.S. 3.

the period that preceded the adoption of the five outer space treaties.⁶³ Thus, there are U.N. General Assembly resolutions, declarations, and non-binding instruments that contribute to the development of space law. The resolutions address aspects such as space security (e.g., the Prevention of an Arms Race in Outer Space Treaty and the development of transparency and confidence-building measures).⁶⁴ In turn, the declarations of legal principles governing activities in outer space, though not legally binding, represent an international consensus on principles such as the state's responsibility for its space activities.⁶⁵ If followed, U.N. General Assembly resolutions via the constant practice of states and international organizations can establish CIL or serve as a basis for future international negotiations on legally binding treaties to regulate the same subjects.⁶⁶

C. *Application of IHL when Armed Conflict Occurs in Space*

From the dawn of the space age, military implications of space activities were not lost to the development of space law, but rather hinged on the desire to maintain outer space as a sanctuary for peace.⁶⁷ Through consensus, the approach to space law at large consisted of “[r]ecognizing the common interest of all [hu]mankind in the progress of the exploration and use of outer space for peaceful purposes” and “[b]elieving that . . . cooperation will contribute to the development of mutual understanding and to the strengthening of friendly relations between states and peoples.”⁶⁸ With space assets and services largely serving only an ancillary role in terrestrial armed conflicts for most of history, this hope has been successful. However, “with the proliferation of space actors and activities, outer space is, among other things, becoming increasingly competitive, congested and contested and thus vulnerable to significant adverse impacts from unlawful actions.”⁶⁹ This is not to contend that a

63. Bin Cheng, *United Nations Resolutions on Outer Space: “Instant” International Customary Law?*, 5 INDIAN J. INT’L L. 23, 35-40 (1965).

64. See for example G.A. Res. 37/92 (Dec. 10, 1982); See G.A. Res. 41/65 (Dec. 3, 1986); See also G.A. Res. 47/68 (Dec. 14, 1992).

65. See for example G.A. Res. 1962 (XVIII) (Dec. 13, 1963); See also G.A. Res. 51/122 (Feb. 4, 1997).

66. Vladlen S. Vereshchetin & Gennady M. Danilenko, *Custom as a Source of International Law of Outer Space*, 13 J. SPACE L. 113 (1985).

67. Frans G. von der Dunk, *Armed Conflicts in Outer Space: Which Law Applies?*, 97 INT’L L. STUD. 188, 193 (2021).

68. OST, *supra* note 8, at pmb1.

69. MCGILL MANUAL ON INTERNATIONAL LAW APPLICABLE TO MILITARY USES OF OUTER SPACE: VOLUME I - RULES 2 (Ram S. Jakhu & Steven Freeland eds., 2022).

conflict in outer space is inevitable. Rather, the world's current multi-polarized and geopolitical nature has increased global concern that the peaceful uses of outer space may be subject to hostile action either extending to, or initiated in, outer space.⁷⁰ Considering the devastating consequences to humanity resulting in the possible extension of an armed conflict in outer space, pre-emptive clarification in this area is imperative.

Should peaceful efforts to resolve disputes fail and an armed conflict regrettably occur in outer space, it is essential to underscore the applicability of IHL within the outer space legal regime. Article III of the OST emphasizes the overarching requirement for states to conduct all space activities *in accordance with* international law, including the U.N. Charter.⁷¹ While this treaty primarily focuses on preventing the placement and testing of weapons of mass destruction in space, IHL remains a branch of international law. Despite IHL's originating from terrestrial conflicts, the ICRC provided the following to the First Committee of the U.N. General Assembly in 2015: "What is certain is that any hostile use of outer space in armed conflict—that is, any use of means and methods of warfare in, from, to or through outer space—must comply with IHL, in particular its rules of distinction, proportionality and precautions in attack."⁷²

Clearly and categorically, the ICRC outlined that any hostile use of outer space in an armed conflict must comply with IHL.⁷³ They note that this application is not to be interpreted to legitimize nor encourage the use of force, militarization, or weaponization in or of outer space.⁷⁴ Instead, the aim of IHL is to maintain a measure of humanity during armed conflict.⁷⁵ Similarly, the International Court of Justice (ICJ) asserted in its 1996 Advisory Opinion that IHL governs "all forms of warfare and [] all kinds of weapons, those of the past, those of the present and those of the future."⁷⁶ Such broad wording indicates the applicability of the rules of law and established principles of armed conflict within an outer space context.

70. *Id.*

71. THE WOOMERA MANUAL ON THE INTERNATIONAL LAW OF MILITARY SPACE OPERATIONS 274 (Jack Beard & Dale Stephens eds., 2024) [hereinafter WOOMERA MANUAL].

72. *Weapons: ICRC Statement to the United Nations, 2015*, (Oct. 15, 2015), <https://www.icrc.org/en/document/weapons-icrc-statement-united-nations-2015>.

73. INTERNATIONAL HUMANITARIAN LAW AND THE CHALLENGES OF CONTEMPORARY ARMED CONFLICTS—RECOMMITTING TO PROTECTION IN ARMED CONFLICT ON THE 70TH ANNIVERSARY OF THE GENEVA CONVENTIONS, 33 (2024) (ebook).

74. *Id.*

75. *Id.*

76. *See* Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, ¶ 86 (July 8).

Irrespective of whether a party to a conflict recognizes IHL's applicability, the fourth Geneva Convention explicitly outlines that they apply to "all cases of declared war or any other armed conflict which may arise between two or more of the High Contracting Parties."⁷⁷ Further, Common Article 1 of the 1949 Geneva Conventions obligate states to "ensure respect for the present Convention in all circumstances."⁷⁸ The phrase *in all circumstances* further can underscore the intention to craft a legal framework that transcends geographic limitations, applying wherever armed conflict erupts.⁷⁹ Further, no provision within the Geneva Conventions explicitly exempt outer space from its purview. This is accompanied by various domestic military manuals, along with national policy statements, that confirm this broad application of IHL, acknowledging that some states hold differing views.⁸⁰

77. Geneva Convention to the Treatment of Prisoners of War, *supra* note 23, at com. art. 2; INTERNATIONAL HUMANITARIAN LAW AND THE CHALLENGES OF CONTEMPORARY ARMED CONFLICTS, *supra* note 73, at 33.

78. Geneva Convention to the Treatment of Prisoners of War, *supra* note 23, at com. art. 1.

79. Romo, *supra* note 31, at 346.

80. Stephen W. Preston, DEPARTMENT OF DEFENSE LAW OF WAR MANUAL ¶ 14.10.2 (2023) [hereinafter DoD MANUAL] ("As a State not party to Additional Protocol I, the United States adopts the position that 'law of war treaties and the customary law of war are understood to regulate the conduct of hostilities, regardless of where they are conducted, which would include the conduct of hostilities in outer space. In this way, the application of the law of war to activities in outer space is the same as its application to activities in other environments, such as the land, sea, air, or cyber domains."); *Australian Working Paper submitted to the Open-Ended Working Group on Reducing Space Threats Through Norms, Rules and Principles of Responsible Behavior* 1-4 (United Nations Off. for Disarmament Aff., Working Paper, 2022) ("Australia maintains the position that international law, including the U.N. Charter, applies to the exploration and use of space The application of international law in space includes international humanitarian law. Relevant rules of IHL include the principles of distinction, proportionality, and necessity, the requirement of precautionary measures, the prohibition of indiscriminate attacks, and the prohibition of using means and methods of warfare that cause superfluous injury. . . ."); *European Union, Joint Contribution to the Open Ended Working Group on Reducing Space Threats Through Norms, Rules, and Principles of Responsible Behaviours* (June 15, 2023), https://docslibrary.unoda.org/OpenEnded_Working_Group_on_Reducing_Space_Threats_-_2022/EU_joint_contribution_to_OEWG_works_on_norms_of_responsible_behaviours.pdf ("[T]he EU and its Member States believe that the final OEWG report should reaffirm the main principles of international law applicable to Outer Space, including the applicability of U.N. and international humanitarian law to outer space"); Rep. of the Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space, ¶ 30, U.N. Doc. A/74/77 (Apr. 9, 2019) (noting concerns among some government experts that discussion of IHL "might signal acceptance of the notion that armed conflict could be conducted in outer space"); United Nations, 5th Meeting, 3d Session of the Open-Ended Working Group on Reducing Space Threats Through Norms, Rules and Principles of Responsible Behaviours (Jan. 30, 2023), <https://webtv>.

Following that general international law applies to human activities in space, IHL maintains its governance of armed conflicts.⁸¹ Aside from a handful of obligations that necessitate implementation in peacetime (e.g., the adoption of implementing legislation and the dissemination of IHL), it does not apply outside armed conflict.⁸² Per conventional IHL, armed conflicts are between two or more states, including cases of military occupation of all or part of the territory of a High Contracting Party, as well as wars of national liberation.⁸³ The ICRC March 2008 Opinion Paper denotes that there are only two types of armed conflict: (a) international armed conflicts (IACs) and (b) non-international armed conflicts (NIACs).⁸⁴ IACs exist when there is a resort to violence between two or more states.⁸⁵ Comparatively, NIACs “are protracted armed confrontations occurring between governmental armed forces and the forces of one or more armed groups, or between such groups arising on the territory of a State [party to the Geneva Conventions],”⁸⁶ where the armed confrontation must reach “a minimum level of intensity and the parties involved in the conflict must show a minimum level of organization.”⁸⁷ Space assets have been utilized by states in connection with fighting NIACs in terrestrial domains; however, technological challenges have been noted to make NIACs in space unlikely for the time being.⁸⁸

un.org/en/asset/k15/k15kmcfcvp (arguing “it is too early to conclude that IHL is truly applicable in space.”).

81. Letter dated June 10, 2014 from the Permanent Representative of the Russian Federation and the Permanent Representative of China to the Conference on Disarmament Addressed to the Acting Secretary-General of the Conference Transmitting the Updated Russian and Chinese Texts of 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) Introduced by the Russian Federation and China, U.N. Doc. CD/1985 (June 14, 2014).

82. *Id.*

83. Geneva Convention to the Treatment of Prisoners of War, *supra* note 23, at com. art. 2.

84. INT’L COMM. OF THE RED CROSS, *How Is the Term “Armed Conflict” Defined in International Humanitarian Law? Opinion Paper (2024)*, Apr. 2024, 1, https://www.icrc.org/sites/default/files/document_new/file_list/armed_conflict_defined_in_ihl.pdf.

85. An international armed conflict occurs when the criteria of com. art. 2(1) of the Geneva Conventions of 1949 are met. Geneva Convention to the Treatment of Prisoners of War, *supra* note 23, at com. art. 2(1).

86. *See generally* INT’L COMM. OF THE RED CROSS, *supra* note 84 (Common Article 3 of the Geneva Conventions of 1949 outlines that a non-international armed conflict refers to a situation in which an “armed conflict not of an international character occurs in the territory of one of the High Contracting Parties.”).

87. *Id.* at 5.

88. *See* WOOMERA MANUAL, *supra* note 71, at 276.

IHL remains applicable irrespective if the resort to force under *jus ad bellum* was lawful.⁸⁹ Confirmed in Additional Protocol 1, it reaffirms that:

[T]he provisions of all the Geneva Conventions of 12 August 1949 and of this Protocol must be fully applied in all circumstances to all persons who are protected by those instruments, without any adverse distinction based on the nature or origin of the armed conflict or on the causes exposed by or attributed to the Parties to a conflict.⁹⁰

Further, the right of the conflicting parties to choose the means or methods of warfare, such as those involving space and the associated space capabilities, remain limited. Included in the 1899 and 1907 Hague Regulations,⁹¹ as well as Article 35(1) of Additional Protocol I,⁹² this is a principal tenant for regulating the conduct of hostilities and highly reflected in CIL.⁹³ The ICRC outlines that “the use of weapons in outer space, would not occur in a legal vacuum. It is constrained by existing law, notably the [OST], the U.N. Charter, and IHL rules governing [the] means and methods of warfare.”⁹⁴ As such, it remains imperative to reconcile any competing obligations of the parties concerned under conflicting treaty rules applicable to space activities.

III. CHALLENGES IN APPLYING IHL TO OUTER SPACE

The presence of “first glance” ambiguities in international law has given spacefaring states the freedom to pursue strategic interests by

89. INTERNATIONAL HUMANITARIAN LAW AND THE CHALLENGES OF CONTEMPORARY ARMED CONFLICTS, *supra* note 73 (“IHL applies to any military operations conducted as part of an armed conflict, including those occurring in outer space, regardless of whether or not the use of force is lawful under the U.N. Charter (*jus ad bellum*).”).

90. See Protocol Additional to the Geneva Conventions of 12 August 1949 and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), at pmbl. ¶5, June 8, 1977, 1125 U.N.T.S. 3 [hereinafter Additional Protocol I].

91. Hague Convention (IV), *supra* note 18, at art. 22 (stating that “[t]he right of belligerents to adopt means of injuring the enemy is not unlimited”).

92. See Additional Protocol I, *supra* note 90, art. 35(1) (stating that “in any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited”).

93. See *for example*, Threat or Use of Nuclear Weapons, *supra* note 76, at ¶¶ 78-79 (affirming that the principle that “States do not have unlimited freedom of choice of means in the weapons they use” is one of the “intransgressible principles of international customary law”).

94. INTERNATIONAL HUMANITARIAN LAW AND THE CHALLENGES OF CONTEMPORARY ARMED CONFLICTS, *supra* note 73, at 33; see also Int’l Comm. of the Red Cross, *Constraints Under International Law on Military Operations In, or In Relation to, Outer Space During Armed Conflicts* 1-6 (Working Paper, 2022), <https://www.icrc.org/en/document/constraints-under-international-law-military-operations-outer-space>.

combining space with terrestrial warfighting capabilities.⁹⁵ IHL applies to situations of armed conflict, “a *de facto* state of hostilities dependent on neither a declaration nor recognition of the existence of ‘war’ by its parties.”⁹⁶ Articles II and III of the Geneva Conventions discern between the rules applicable to IACs and NIACs.⁹⁷ Notably though, the term “armed conflict” is not defined in either article.⁹⁸ This omission was not an oversight, but rather a strategic attempt to depoliticize the applications of the conventions to the situations intended for. The ICRC notes that:

Having learned from earlier reliance on notions such as “declarations of war”, the drafters’ choice of the notion of “armed conflict” ensured that the Conventions’ catalyst would never become a vestige of its time, but rather a concept meant to endure and, indeed, adapt in response to the changing environments for which the Conventions are needed. The application of IHL has since been predicated on a fact-based analysis rather than only the formal recognition by a belligerent that a state of war exists.⁹⁹

Nonetheless, the legal framework applicable must be determined to assess the conduct of military operations. As such, the ICRC makes an independent finding based on the facts and methodically classifies situations for the purposes of its work.¹⁰⁰ Following this, scholars have contemplated various scenarios where such conflicts might occur in the future.¹⁰¹ These scenarios not only include direct hostilities taking place

95. General Secretariat of the Council of the European Union, *Space: The New Battleground of Modern Warfare* 6-7 (European Union, 2025).

96. INT’L COMM. OF THE RED CROSS, *supra* note 84.

97. *Id.* at 5.

98. INT’L COMM. OF THE RED CROSS, *Commentary on the Geneva Conventions: Commentary to Art. 2 of the 1949 Geneva Conventions* ¶ 1 (1952), <https://perma.cc/3RKL-SM77> (“The substitution of this much more general expression for the word ‘war’ was deliberate One may argue almost endlessly about the legal definition of ‘war’. A State can always pretend, when it commits a hostile act against another State, that it is not making war, but merely engaging in a police action, or acting in legitimate self-defence. The expression ‘armed conflict’ makes such arguments less easy,” emphasis added).

99. *Id.*

100. INT’L COMM. OF THE RED CROSS, *supra* note 84.

101. *Id.* For example, these include, but are not limited to: (1) the military use of space, with concerns about space-based weapons potentially violating IHL principles of proportionality and necessity; (2) the regulation of space-based weapons, which may contradict the peaceful use provisions of the OST; (3) issues arising from dual-use satellites that complicate the distinction between military and civilian functions in conflict; (4) the creation of space debris during military operations, which may cause excessive collateral damage to civilian satellites; (5) the neutrality of space during armed conflict, potentially violating protections for neutral parties and civilian space infrastructure; and (6) the transfer of dual-use space technology, which could be diverted for military purposes, raising concerns under IHL about non-proliferation and its impact on civilian populations.

in outer space but also situations where space is involved in terrestrial conflicts, such as using space-based weapons to attack ground targets. In this broader understanding, armed conflicts in outer space can be seen to encompass warfare that originates from, transits through, or occurs within the outer space domain. While it would be impossible to list and analyze every situation of potential ambiguity surrounding the law of armed conflict to the outer space legal domain, this section highlights two points of contention: (a) the lack of sovereignty in outer space and (b) the dual-use dilemma impacting distinction and proportionality value judgements.

A. *U.N. Charter and Jus Ad Bellum Ambiguity*

Military applications in space are evolving and growing quickly, making it difficult for states and non-government agencies to determine and implement the governing rules of IHL in outer space. Due to technological advancements, states, policymakers, and practitioners must confront new and real conditions amid these difficulties, rather than just merely theoretical threats or issues. Article III of the OST effectively inserts into the domain of space law that states are to conduct all space activities in accordance with international law, including the U.N. Charter.¹⁰² As noted in Part I, Article 2(4) of the U.N. Charter prohibits the use of force and binds all states under CIL:

All Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations.¹⁰³

The ICJ has further recognized that the prohibition of the use of force is a rule of CIL, as well as a cornerstone of the U.N. Charter.¹⁰⁴ This obligation in Article 2(4) of the U.N. Charter reigns over other obligations of member states under any other international agreement in the event of conflicting obligations.¹⁰⁵ Widely considered a peremptory norm of international law (*ius cogens*), the prohibition against the use of force is “a norm accepted and recognized by the international community of states as a whole as a norm from which no derogation is

102. G.A. Res. 2222 (XXI), at Art. III (Dec. 19, 1996).

103. U.N. Charter, *supra* note 13.

104. *Nicaragua v. U.S.*, 1986 I.C.J. at ¶ 73; *see also* *Armed Activities on the Territory of the Congo (Dem. Rep. Congo v. Uganda)*, Judgment, 2005 I.C.J. 168, ¶ 148 (Dec. 19).

105. U.N. Charter, *supra* note 13, at art. 103.

permitted and which can be modified only by a subsequent norm of general international law having the same character.”¹⁰⁶

Under the U.N. Charter, there are two universally accepted exceptions to the use of force prohibition:¹⁰⁷ the right to individual or collective self-defense under Article 51¹⁰⁸ and collective enforcement action authority by the U.N. Security Council under Chapter VII.¹⁰⁹ Article 51 provides that:

Nothing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security. Measures taken by Members in the exercise of this right of self-defence shall be immediately reported to the Security Council and shall not in any way affect the authority and responsibility of the Security Council under the present Charter to take at any time such action as it deems necessary in order to maintain or restore international peace and security.¹¹⁰

The right of self-defense remains subject to CIL, as well as the core principles of IHL (i.e., the requirements of necessity, distinction, precaution, and proportionality).¹¹¹ As states may engage with use of force when acting in self-defense against an armed attack, not every use of force will amount to armed attack (i.e., such action requires a certain degree of gravity).¹¹² Likewise, the U.N. Security Council may authorize the use of force to maintain and restore peace, and security.¹¹³ Per Chapter VII of the U.N. Charter, the Security Council is to take measures in case of a threat to the peace, breach of the peace or act of

106. Int’l Law Comm’n, *Report on the Work of Its Seventy-First Session*, U.N. GAOR, 74th Sess., Supp. No. 10, U.N. Doc. A/74/10, ch. V at conclusion 2 (2019); *see also*, International Law Commission, *Draft Conclusions on Subsequent Agreements and Subsequent Practice in Relation to the Interpretation of Treaties, with Commentaries*, U.N. Doc. A/73/10, annex, (2018), https://legal.un.org/ilc/texts/instruments/english/commentaries/1_11_2018.pdf. The U.N. International Law Commission stated in its commentary on the Draft Articles on the Law of Treaties that “the law of the Charter concerning the prohibition of the use of force” is “a conspicuous example” of a peremptory norm.

107. *See* WOOMERA MANUAL, *supra* note 71, at 202.

108. U.N. Charter, *supra* note 13, at art. 51.

109. *Id.* at arts. 39-51.

110. *Id.* at art. 51.

111. *Nicaragua v. U.S.*, 1986 I.C.J. at ¶ 176; *See also* Oil Platforms (Islamic Republic of Iran v. United States of America), Judgment, 2003 I.C.J. 161, ¶ 51 (Nov. 6); *See also* Threat or Use of Nuclear Weapons, *supra* note 76, at ¶ 41.

112. Laurie R. Blank, *Irreconcilable Differences: The Thresholds for Armed Attack and International Armed Conflict* 96, NOTRE DAME L. REV. 249, (2020).

113. U.N. Charter, *supra* note 13, at arts. 39-51.

aggression in accordance with articles 41 and 42 of the U.N. Charter (which measures include authorizing military action).¹¹⁴

Notably, the ICJ has yet to define a prohibited “use of force” in its jurisprudence, nor has there been general agreement on the term.¹¹⁵ While scholarly sources have tended to define an “armed attack” under Article 51 of the U.N. Charter, the rules of treaty interpretation have been applied to distill a set of elements of a prohibited use of force.¹¹⁶ U.N. Charter Article 2(4) sets out contextual requirements to constitute a use of force, which includes that it must be by a state, in international relations, and “against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the [U.N.]”¹¹⁷ Under the origins and traditional application, it is generally accepted in reference to *armed* or *physical* force.¹¹⁸ While the elements for a use of force are not set out in the text, scholars have identified the following through treaty interpretation: means, effects, gravity, and coercive or hostile intent.¹¹⁹ Not all elements must be present to constitute

114. See U.N. Charter, *supra* note 13, at arts. 41-42 (Art. 41 provides: “The Security Council may decide what measures not involving the use of armed force are to be employed to give effect to its decisions, and it may call upon the Members of the United Nations to apply such measures. These may include complete or partial interruption of economic relations and of rail, sea, air, postal, telegraphic radio, and other means of communication, and the severance of diplomatic relations.” Art. 42 provides: “Should the Security Council consider that measures provided for in Article 41 would be inadequate or have proved to be inadequate, it may take such action by air, sea, or land forces as may be necessary to maintain or restore international peace and security. Such action may include demonstrations, blockade, and other operations by air, sea, or land forces of Members of the United Nations.”).

115. The ICJ has addressed the interpretation and application of Article 2(4) in several of its decisions, both directly and indirectly, but has not explicitly defined its content. See *Corfu Channel* (United Kingdom of Great Britain and Northern Ireland v. Albania), Judgment, 1949 I.C.J. 4 (Dec. 15); *Fisheries Jurisdiction* (Federal Republic of Germany v. Iceland), Judgment, 1972 I.C.J. 175 (June 5); see *United States Diplomatic and Consular Staff in Tehran* (United States of America v. Iran), Judgment, 1979 I.C.J. 3 (Nov. 29); see *Fisheries Jurisdiction* (Spain v. Canada), Judgment, 1995 I.C.J. 432 (Mar. 28); see *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*, Advisory Opinion, 2004 I.C.J. 136; *Dem. Rep. Congo v. Uganda*, 2005 I.C.J. at ¶ 148.

116. Vienna Convention on the Law of Treaties, May 23, 1969, 1155 U.N.T.S. 331.

117. U.N. Charter, *supra* note 13, at art. 2(4).

118. See *WOOMERA MANUAL*, *supra* note 71, at 203 (notes that “proposals by some States to include economic measures as a form of force were explicitly rejected by the conference (no matter how damaging, harmful, or destructive the consequences”).

119. ERIN POBJIE & ALMUDENA AZCÁRATE ORTEGA, *SPACE SECURITY LEGAL PRIMER 1—OUTER SPACE & USE OF FORCE 24* (UNIDIR, 2024).

a use of force; they are to be weighed and balanced to determine if the threshold is met.¹²⁰

The U.N. Institute for Disarmament Research 2024 Space Security Legal Primer Report identified several key areas that lack clarity regarding the definition of a prohibited use of force in outer space.¹²¹ First, there is the question as to whether a use of force encompasses acts with indirect effects. For example, consider a kinetic destruction of a satellite leading to debris that damages other satellites, where the damage is only temporary and reversible (e.g., jamming a communication satellite's signal). Or, consider the possibilities of potential but unrealized harms, such as a close and unannounced rendezvous and proximity operation near another state's critical satellite.¹²² The Report also highlights the ambiguity surrounding whether a prohibited act must meet a specific severity threshold. For instance, one must consider whether a brief, low-level jamming would be considered the same as the permanent disabling of a crucial satellite.¹²³ Furthermore, the Report notes a lack of clarity regarding what type of intent is relevant for an act to be considered a "use of force."¹²⁴ Per the categories of deliberate, hostile, or coercive intent, there is the difficulty of discerning intent behind an unannounced close satellite maneuver. Likewise, whether reckless intent that creates long-lasting space debris suffices, such as through a kinetic anti-satellite (ASAT) weapons test, may be sufficient for justification.¹²⁵ Addressing

120. ERIN POBJIE, *THE MEANING OF PROHIBITED 'USE OF FORCE' IN INTERNATIONAL LAW* 5 (Max Planck Institute for Comparative Public Law & International Law (MPIL) 2022).

121. Pobjie, *supra* note 119.

122. TALLINN MANUAL 2.0 ON THE INTERNATIONAL LAW APPLICABLE TO CYBER OPERATIONS 415 (Michael N. Schmitt ed. 2017); *see also* DoD MANUAL, *supra* note 80, at §16.5.2 (2023); CLAYTON SWOPE ET AL., *SPACE THREAT ASSESSMENT*, 3-5 (2024).

123. *See* Pobjie, *supra* note 119, at 33; *see also* International Law Comm'n, *Articles on Responsibility of States for Internationally Wrongful Acts*, U.N. Doc. A/RES/56/83, arts. 2 ¶ 3 and 10 (2001), reprinted in [2001] 2 YEARBOOK OF THE INTERNATIONAL LAW COMMISSION 1 ("In the absence of any specific requirement of a mental element in terms of the primary obligation, it is only the act of a State that matters, independently of any intention."); *see also* IAN BROWNLIE, *INTERNATIONAL LAW AND THE USE OF FORCE BY STATES*, 377 (1963).

124. Pobjie, *supra* note 119, at 6.

125. *See* Pobjie, *supra* note 119, at 31 ("A forcible act that interferes with, damages or destroys a satellite can have indirect or reverberating effects, which may include damage or destruction to other space objects caused by the resulting debris from kinetic ASAT, terrestrial effects including death or injury of persons, as well as the permanent impact on terrestrial biomass and irreversible effects on ecosystems such as oceans, impoverishing the living conditions of large human populations. It can also cause interruption of services that the satellite provides. It would be particularly grave if these services were related to the operability of critical infrastructure. Temporary and reversible effects: it is legally open whether the prohibition of the use of force under Article 2(4) and customary international law covers temporary and reversible effects. Many counterspace capabilities can produce temporary and reversible effects, for example jamming or

these ambiguities remains crucial for building common understandings among states on the meaning of prohibited use of force in the space domain and for advancing space security debates generally.

Territorial control and jurisdiction are also fundamental manifestations of a state's sovereignty.¹²⁶ U.N. Charter Article 2(4) focuses on the use of force between sovereign states. NIACs are not commonly addressed in the U.N. Charter, despite many armed conflicts being classified as such since World War II.¹²⁷ That said, most military activities in outer space remain currently limited to states. Although the OST prohibits assertions of sovereignty from a state, Article VII mandates that a state respect some aspects of jurisdiction as "[a] State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body."¹²⁸ Notably, this does not provide the state of registry *exclusive* jurisdiction (e.g., other states may assert concurrent jurisdiction on another basis such as individual nationality).¹²⁹ Nationality jurisdiction is grounded in the notion that a sovereign state has jurisdiction over its nationals, regardless of location.¹³⁰ A state may also "ascribe nationality to corporations, vessels, and aircraft."¹³¹ Notably, for air vessels and aircraft, this is a "special and independent type of jurisdiction"¹³² that remains associated with the global legal regimes governing maritime and aerial activities.

The Registration Convention and OST Article VIII denote that registered space objects have a quasi-territorial status that can be *likened* to that of a registered aircraft in international air space or ships on the

dazzling, high-powered microwaves, electronic pulses and the use of cyber for counterspace. Due to military, commercial and civilian reliance on space systems and services, harmful effects that are temporary and reversible may still be significant particularly if they affect critical infrastructure.") (citation omitted).

126. Malgosia Fitzmaurice and Paul Gragl, *Sovereignty, Territory and Jurisdiction*, 10 THE CAMBRIDGE HIST. OF INT'L L. 162-95 (2025).

127. See U.N. Charter, *supra* note 13.

128. BIN CHENG, STUDIES IN INTERNATIONAL SPACE LAW 414 (1997).

129. See WOOMERA MANUAL, *supra* note 71, at 87.

130. *Id.* ("For example, another State might assert prescriptive jurisdiction on the basis of the nationality of a person located on another State's space object. shared or concurrent jurisdiction is reflected in art 22 of the ISS Agreement, which grants primary jurisdiction to prosecute an astronaut to the State of nationality and secondary jurisdiction to prosecute the perpetrator is granted to both (i) the State of the victim, and (ii) the State that owns the flight element where the crime took place (or where criminal damage occurred to the flight element).").

131. *Id.*

132. *Id.*

High Seas.¹³³ However, this is not a one-to-one comparison. In outer space, a state retains jurisdiction on the basis of the space object's state of registry via Article III of the OST, not on the basis of *nationality* and cannot meet the legal requirements imposed on, for example, that of a war ship as enforced by the law of the sea.¹³⁴ Notably, the drafters of the OST intentionally refrained from using the word "nationality" to refer to registered space objects, a conscious deviation from the practice regarding registered ships and aircrafts.¹³⁵ As a result, the formal designation and legally understood concept of *flag states* may not likely apply to objects in space.¹³⁶ Suggesting a distinction between space objects to aircrafts and ships, would it be lawful for a belligerent to treat an opposing belligerent space object as a target for the use of force akin to that of an aircraft or ship under IHL? This question only becomes more convoluted, raising factual and legal questions, when considering the structural principles to the attribution of the use of force in outer space to states via commercial actors.

Article VI of the OST purports that any action taken by a non-governmental entity in outer space is attributable to the state as if it carried out the act itself, bearing direct responsibility.¹³⁷ Contrasting to the regime

133. *Id.*; see generally, Christopher Daniel Johnson, *The Outer Space Treaty*, in OXFORD RESEARCH ENCYCLOPEDIA OF PLANETARY SCIENCE (2018) noting that "the [OST] is similar to other treaties, including treaties governing the high seas, international airspace, and the Antarctic, all of which govern the behavior of states outside of their national borders").

134. United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397, 21 I.L.M. 1245 (1982) (defining a "warship" as "a ship belonging to the armed forces of a State bearing the external marks distinguishing such ships of its nationality, under the command of an officer duly commissioned by the government of the State and whose name appears in the appropriate service list or its equivalent, and manned by a crew which is under regular armed forces discipline."); see also WOOMERA MANUAL, *supra* note 71 ("aside from the absence of sovereign immunity, other legal requirements for a warship under the law of the sea cannot be satisfied by a space object. For instance, Article 29 of UNCLOS requires that a warship possess the nationality of the flag State and bear "the external marks distinguishing such ships of its nationality." Space objects, however, do not technically have a nationality; registration does not require specifying any particular military status (see Rule 8: Registration of Space Objects), and there are no required "markings" for space objects—indeed, conventional "markings" are particularly impractical in the space environment").

135. Dunk, *supra* note 67, at 210 ("[I]n the context of space law, the drafters of the Outer Space Treaty made a conscious decision not to use the word "nationality" for properly registered space objects, thus deviating from the practice with regard to ships and aircraft, effectively suggesting the status of a space object is not entirely similar to that of a ship or an aircraft.").

136. *Id.* See ALSO BIN CHENG, SPACE OBJECTS AND THEIR VARIOUS CONNECTING FACTORS, in OUTLOOK ON SPACE OVER THE NEXT 30 YEARS, 203-15 (Brill, 1997).

137. Treaty on Principles Governing the Activities of States in Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, art. 6, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205. Article VI of the Outer Space Treaty establishes that states parties bear international responsibility for all national activities in outer space, including the Moon and other

of state responsibilities on Earth, Article VI's mandate that a state is liable for its national activities in outer space is a novel development in public international law. Specifically, this Article provides that:

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, 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.¹³⁸

Here, a state cannot escape accountability by denying any responsibility for the actions of its private persons. Adopting national laws and regulations is how many states carry out their obligations under Article VI.¹³⁹ It remains unsettled to what extent CIL principles for attributing actions under the law of state responsibility,¹⁴⁰ particularly *in contra bellum*, are displaced by OST Article VI.¹⁴¹ Resultingly, a use of force by a non-state actor (e.g., a commercial space actor) could be construed as a breach of the state of registration's prohibition on the use of force. Per Article 2(4) of the U.N. Charter, the requirement for a use of force to be in "international relations" is met when the force used against another state or against objects or persons with a sufficient nexus to another state.¹⁴² Determining accountability is an increasingly pressing matter as the number of dual-purpose objects in space (many run by commercial entities) continues to grow exponentially.¹⁴³ Regarding the use of force, an interpretation consistent with Article VI of the OST would

celestial bodies, regardless of whether such activities are carried out by governmental or non-governmental entities. In the case of non-governmental actors, states must authorize and continually supervise their activities to ensure compliance with international obligations. These actions are nevertheless regarded as national activities of the state concerned. Furthermore, when outer space activities are conducted by or on behalf of international organizations, responsibility is shared between the organization and the participating states, depending on their level of involvement. This provision ensures that states cannot evade liability through privatization and forms the legal foundation for national space laws that regulate and oversee private sector participation in space.

138. OST, *supra* note 8, at art. VI.

139. *Articles on Responsibility of States for Internationally Wrongful Acts*, *supra* note 123.

140. See Pobjie, *supra* note 119, at 86; see also FRANS G. VON DER DUNK, THE ORIGINS OF AUTHORISATION: ARTICLE VI OF THE OUTER SPACE TREATY AND INTERNATIONAL SPACE LAW, in NATIONAL SPACE LEGISLATION IN EUROPE 3-28 (Frans G. von der Dunk ed., 2011) (canvassing differing positions in the debate over the interpretation of Article VI).

141. *Id.*

142. U.N. Charter, *supra* note 13, at art. 2(4).

143. Eng Tong See, *Commercialization of Space Activities—The Laws and Implications* 82 J. AIR L. & COM. 145, 145 (2017).

have obvious legal and policy ramifications.¹⁴⁴ It might also lead to state accountability for the national actions of non-state entities in outer space under other relevant legal frameworks.

Of the textual requirements, the U.N. Charter also notes that the use of force is “against the territorial integrity or political independence of any State.”¹⁴⁵ In the conception of IACs, territorial sovereignty is imperative, and in turn, the issues of attribution between states and non-state actors become significant. Importantly, to identify which state, if any, is the target of a “use of force” in outer space, there is no set rule.¹⁴⁶ Specifically, Article 51 of the U.N. Charter does not specify that the armed attack that gives rise to the exercise of self-defense must be carried out by a state.¹⁴⁷ Following this, the text leaves it open for armed attacks to possibly be carried out by non-state actors. If such an attack is not considered covered by the U.N. Charter protections, some scholars have questioned whether it could be deemed to trigger the self-defense right per Article 51 as an “armed attack . . . against a Member of the [U.N.]?”¹⁴⁸ As to be discussed in the next section in further detail, if deemed to trigger the right to self-defense, to what extent would this right be deemed necessary and proportional to attack other satellites (e.g., ones vital to civilian infrastructure) or the terrestrial sovereignty of another state? Frans G. von der Dunk voices these concerns as follows:

Or, considering the Charter’s characterization of the right of self-defense as “inherent” and the ongoing discussion as to a possible customary right of self-defense *outside* the Charter, would states whose space objects were attacked be entitled to respond with the use of force—or non-forceful means of degrading or destroying the responsible state’s capabilities such as by cyber interference—outside the Charter where it would not be necessary to meet its triggers of territorial integrity or political independence? And, if so, would such an entitlement translate into a right to attack terrestrial assets of the attacker instead of or in addition to attacking its satellite(s)? Or would counterattacks on the attacker’s satellites be legitimized as countermeasures or reprisals, where the legitimacy of the use of force may be restricted merely by such concepts as proportionality and necessity and a lack of direct human victims?¹⁴⁹

144. See Pobjie, *supra* note 119, at 26.

145. U.N. Charter, *supra* note 13, at art. 2(4).

146. See Pobjie, *supra* note 119, at 28.

147. U.N. Charter, *supra* note 13, at art. 51.

148. Dunk, *supra* note 67, at 210.

149. *Id.*

In addition, a targeted satellite may be of interest to multiple states, for example, due to legal ownership,¹⁵⁰ registration as a launching state,¹⁵¹ or interference or damage to the satellite resulting from the use of the satellite's services.¹⁵² With this in mind, the concept of an injured state, established in the international law of state liability,¹⁵³ can be used to determine which state or states are the victims.¹⁵⁴ As such, multiple state victims could result from this, implying that deploying force against a commercial satellite could be within the range of the prohibition of the use of force. Supported by the *travaux préparatoires* of the U.N. Charter and as confirmed by states during the drafting of the 1970 Friendly Relations Declaration,¹⁵⁵ Article 2(4)'s inclusion of the phrase "in any other manner inconsistent with the Purposes of the [U.N.]," outlines that the prohibition intended to be comprehensive and avert loopholes.¹⁵⁶

Resultingly, the expanding militarization of outer space reveals some key areas that lack clarity in the application of IHL and the U.N. Charter's use of force framework in outer space. The legal implications of OST Article VI, which attributes the actions of non-governmental space actors to their state of registration, remain unsettled under *ius contra bellum*.¹⁵⁷ Additionally, uncertainty surrounds key elements required to define a prohibited "use of force," including the contextual thresholds for attribution, the relevance of indirect or reversible effects, the degree of

150. OST, *supra* note 8, at arts. VIII ("A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body.").

151. Registration Convention, *supra* note 61, at arts. I(c), II. Article II outlines that states must register space objects, which ties the object to the state for legal and ownership purposes and that registration creates a presumption of ownership and responsibility. Article I(c) provides the definition of "Launching State" to include state which launches or procures the launching of a space object or from whose territory or facility a space object is launched.

152. See Pobjie, *supra* note 116, at 28.

153. This principle is well established in the international law of state liability, which holds states internationally responsible for the conduct of entities under their jurisdiction, including in areas beyond national territory such as outer space.

154. See Hitoshi Nasu, *Targeting a Satellite: Contrasting Considerations Between the Jus ad Bellum and the Jus in Bello*, 99 INT. L. STUD. 142, 164 (2022). This principle is well established in the international law of state liability, which holds states internationally responsible for the conduct of entities under their jurisdiction, including in areas beyond national territory such as outer space.

155. ERIN POBJIE, PROHIBITED FORCE: THE MEANING OF 'USE OF FORCE' IN INTERNATIONAL LAW (Cambridge Univ. Press 2024).

156. See Pobjie, *supra* note 119, at 28.

157. Tom Ruys, *The Meaning of Force and the Boundaries of the Jus ad Bellum: Are Minimal Uses of Force Excluded from UN Charter Article 2(4)?*, 108 AM. J. INT'L L. 159, 163-164 (2014).

gravity required, and the type of intent necessary to trigger legal consequences.¹⁵⁸ The need for legal clarity and consensus, particularly as the outer space domain grows more congested, contested, and strategically beneficial, will remain imperative. Without targeted legal interpretative development and application, the risk of miscalculation or escalation in space may continue to grow.

B. Distinction and Proportionality During the Dual-Use Dilemma

Moving forward, if the *jus ad bellum* has been sufficiently established such that the inherent right to self-defense is triggered upon an armed attack, the state's use of force must also meet the core principles of IHL—*jus in bello*—in particular, distinction and proportionality. The principle of distinction obliges parties to a conflict to delineate at all times between military and civilian objects, as well as between combatants and civilians; specifically, military operations are only to be directed against military objectives.¹⁵⁹ Article 48 of Additional Protocol 1 to the Geneva Conventions outlines that “the only legitimate object which states should endeavour to accomplish during war is to weaken the military forces of the enemy.”¹⁶⁰ Dating back as far as the preamble to the 1868 St. Petersburg Declaration, this is recognized as a “cardinal principle”¹⁶¹ of IHL by the ICJ, forming part of CIL for both IACs and NIACs.¹⁶² The Woomera Manual on the International Law of Military Space Operations notes the principle of distinction in its thirty-second rule:

This Rule on Distinction applies to all military space operations. “Military Operation” is a broad term; while it certainly encompasses an “attack” (see Rule 31: Attack) in the space domain, it should also be understood to mean “any movements, manoeuvres and other activities whatsoever carried out by the armed forces with a view to combat.”¹⁶³

Importantly, the term “military objective” comprises both objects and persons and can include dual-use objects in space, such as commercial satellites in certain circumstances.¹⁶⁴

158. See Pobjie, *supra* note 119, at 7.

159. See Protocol Additional I, *supra* note 90, at art. 41.

160. Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight, Dec. 11, 1868, 138 Consol. T.S. 297.

161. See *Threat or Use of Nuclear Weapons*, *supra* note 76, at ¶¶ 78-79.

162. See generally, *The Principle of Distinction between Civilian Objects and Military Objectives*, ICRC, <https://ihl-databases.icrc.org/en/customary-ihl/v1/rule7>.

163. See WOOMERA MANUAL, *supra* note 71, at 310-311.

164. *Id.*

Space objects may be deemed dual-use if they serve (or are capable of serving),¹⁶⁵ simultaneously or sequentially, military and civilian purposes.¹⁶⁶ Article 52(2) of Additional Protocol I to the Geneva Conventions defines military objectives as “objects which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a definite military advantage.”¹⁶⁷ Alternatively, civilian objects are protected from being attacked during an armed conflict and entail all objectives that are not military objectives.¹⁶⁸ This distinction is integral in IHL. If the objective meets the definition given, irrespective of whether it might also provide services to civilians, it will be deemed a military objective. The increasing reliance on commercial satellites and commercial providers to support military activities via space objects underpins the importance of distinction for purposes such as the prohibition of indiscriminate attacks and the principle of proportionality.

A majority of commercial space systems serve both civilian and military purposes.¹⁶⁹ For instance, global navigation satellite systems (GNSS) are used for both military navigation and essential civilian services including communication, transportation, and financial transactions.¹⁷⁰ Here, a dual-use commercial satellite may become a military objective when the cumulative conditions outlined by Article 52(2) of Additional Protocol I to the Geneva Conventions are met (i.e., if its use effectively contributes to military action, and if its total or partial destruction, capture, or neutralization offers a definite military advantage in the circumstances ruling at the time).¹⁷¹ Even in the case of a satellite bus that carries distinct military and civilian payloads, it may qualify the

165. International Law Association Study Group on the Conduct of Hostilities in the 21st Century, *The Conduct of Hostilities and International Humanitarian Law: Challenges of 21st Century Warfare*, 93 INT'L L. STUD. 322 (2017). But, see also U.S. Dep't of Def., *Law of War Manual*, ¶ 5.6.6.1 (2015) (noting that “purpose means the intended or possible use in the future. For example, runways at a civilian airport could qualify as military objectives because they may be subject to immediate military use in the event that runways at military bases have been rendered unserviceable or inoperable”).

166. See WOOMERA MANUAL, *supra* note 71, at 321.

167. See Additional Protocol I, *supra* note 90, at 52(2).

168. *Id.*

169. NATO's Overarching Space Policy, NATO (June 27, 2019), <https://www.nato.int/en/about-us/official-texts-and-resources/official-texts/2019/06/27/natos-overarching-space-policy>.

170. M.P. Breeman, F. Grillo & G. Van De Kaa, *Battles in Space: De-Facto Standardization of Global Navigation Satellite Systems*, 65 J. ENG. TECH. MGMT. 101693, 2 (2022).

171. If met, the distinction will apply despite its concurrent civilian use, purpose, or nature.

entire satellite as a military objective, including its ground station.¹⁷² That said, if the civilian payload can be functionally and physically distinguishable as a discrete object, the civilian payload would not classify as a military objective and cannot be a target of attack.¹⁷³

An attack on a GNSS satellite, even if justified by its military function, could have devastating and disproportionate effects on civilians who rely on those systems. Essential civilian infrastructure, including communication networks, navigational aid systems, and disaster relief operations, rely heavily on satellites.¹⁷⁴ Even more so, an assault on a wholly military satellite could be anticipated to impair further satellites that fulfill civilian functions under certain circumstances (e.g., through orbital debris).¹⁷⁵ The taking down or damaging of these satellites might severely impair a state's capacity to operate, possibly resulting in widespread anarchy, a collapse of the economy, and excessive harm and fatalities amongst those who are supposed to be protected.¹⁷⁶ While these consequences are not the direct result of the attack itself, an attack on a dual-use satellite would still be governed by the prohibitions of indiscriminate attacks and the principle of proportionality.¹⁷⁷ Article 51(5)(b) of Additional Protocol to the Geneva Conventions state that:

A Party to an armed conflict may not make an attack, including an attack involving a military space operation, that may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, that would be excessive in relation to the concrete and direct military advantage anticipated.¹⁷⁸

Importantly, the principle of proportionality requires the balancing of two critical factors: the military advantage from an attack and the

172. See WOOMERA MANUAL, *supra* note 71, at 321.

173. *Id.*

174. See WOOMERA MANUAL, *supra* note 71, at 345, citing footnote 219 (“One State at State Consultations noted that practical considerations may impede the consideration of ‘civilian functions’ in this proportionality analysis, emphasizing that it may be very hard to identify or quantify such civilian functions, in particular since it may depend on the subjective decisions of civilian regarding how to use the object that is damaged by the attack.”).

175. *Id.*

176. Romo, *supra* note 31, at 349.

177. See Svenja Berrang, *How Would IHL Apply to Hostilities in Outer Space?*, HUMANITARIAN L. & POL’Y (Nov. 2, 2023), <https://blogs.icrc.org/law-and-policy/2023/11/02/how-would-ihl-apply-to-hostilities-in-outer-space/>.

178. See WOOMERA MANUAL, *supra* note 71, at 337-46; see generally Additional Protocol I, *supra* note 90, at Art. 51(5)(b).

anticipated harm to civilians or civilian objects.¹⁷⁹ This principle is also associated with the conduct of military operations to be performed with *constant care*.¹⁸⁰ Such obligations face special challenges in the context of outer space compared to others.

In particular, there are heightened concerns about destructive attacks on space objects leading to long-lasting debris (e.g., an ASAT system destroying a target via a kinetic energy weapon that produces a cloud of lethal debris).¹⁸¹ Consider even small sizes of debris have the potential to do damage or destroy other space objects given the high travelling speed.¹⁸² Scholars have highlighted the unpredictable nature of the threat posed and its enduring impact that could go on for as long as even centuries.¹⁸³ This threat is not limited to the increasing number of space objects, but also to the danger posed to persons generally engaged in a wide range of outer space activities (e.g., those engaged in peaceful space operations).¹⁸⁴ In accordance with Article 58 of Additional Protocol I to the Geneva Conventions, the principle of precaution mandates that all feasible measures be taken to minimize foreseeable harm to civilian

179. Robert D. Sloane, *Puzzles of Proportion and the "Reasonable Military Commander": Reflections on the Law, Ethics, and Geopolitics of Proportionality*, 6 HARV. NAT'L SEC. J. 299, 309-10 (2015).

180. See generally Geneva Convention (IV), *supra* note 23, at art. 57. In the context of the Geneva Conventions, constant care is a duty that arises in situations of armed conflict, requiring states or parties to the conflict to always prioritize the well-being and safety of those who are not directly participating in the fighting.

181. See William J. Broad & David E. Sanger, *Flexing Muscle, China Destroys Satellite in Test*, N.Y. TIMES (Jan. 19, 2007), <https://www.nytimes.com/2007/01/19/world/asia/19china.html>; Leonard David, *China's Anti-Satellite Test: Worrisome Debris Cloud Circles Earth*, SPACE.COM (Nov. 17, 2021), <https://www.space.com/3415-china-anti-satellite-test-worrisome-debris-cloud-circles-earth.html>.

182. See Gunnar Leinberg, *Orbital Space Debris*, 4 J. L. & TECH. 93, 98 (1989) (noting that "[a] 3 mm piece of space debris traveling at 10 km/sec. has as much kinetic energy as a 12 lb bowling bowl travelling at 60 mph," and that the Challenger shuttle collision with a 0.2 mm paint fleck "le[ft] a crater approximately 2.4 mm across and 0.63 mm deep that cost \$50,000 to replace").

183. Daria Diaz, *Trashing the Final Frontier: An Examination of Space Debris from a Legal Perspective*, 6 TUL. ENV'T L.J. 369, 371-72 (1993) ("In 1984, the Solar Max satellite was permanently disabled after it collided thousands of times with what may have been nearly invisible pieces of rocket fuel or satellite fragments. Scientists who examined the aforementioned debris also discovered microscopic shards of human urine.") (citation omitted).

184. See Berrang, *supra* note 177 ("[T]he specific characteristics of space pose challenges to the application of the principles of IHL governing the conduct of hostilities to military operations in, from, to, or through outer space in the context of an armed conflict, especially with regard to the relationship between commercial space actors and military").

objectives.¹⁸⁵ Legal scholars contend that the integrated application of the principles of proportionality and precaution are essential to safeguarding critical infrastructure whose destruction could have severe humanitarian implications.¹⁸⁶ Opponents to this view contend that such an approach risks imposing overly broad constraints on military operations, prohibiting what should be deemed lawful attacks on infrastructure that serves military purposes.¹⁸⁷ Importantly, there is no current state practice to rely on or serve as a precedent to help make such decisions.

Furthermore, consider an armed attack on a large group of satellites that are dual-use in nature performing military and civilian functions. Quantifying the precise harm caused by the disruption of the wide range of civilian services provided by satellites is inherently challenging, and to some extent uniquely impossible to predict accurately in the space domain.¹⁸⁸ Nonetheless, under the rule of proportionality in IHL, any anticipated incidental harm to civilians resulting from such an attack must be evaluated, particularly given the global interconnectivity of modern societies, where consequences may extend beyond the states directly engaged in the conflict.¹⁸⁹ However, certain effects, such as inconvenience, psychological distress, fear, and the temporary loss of non-essential satellite services, are generally excluded from the

185. Environmental impacts tend to be dispersed across large numbers of people and across long periods of time. Malcolm Fairbrother, *Externalities: Why Environmental Sociology Should Bring Them in*, 2 ENV'T SOCIO. 375, 376 (2016) (defining environmental externalities).

186. See generally, Amichai Cohen, *Proportionality in International Humanitarian Law: Consequences, Precautions, and Procedures* 1, 78-83 (2021); see also BRIAN T. BENNETT, UNDERSTANDING, ASSESSING, AND RESPONDING TO TERRORISM: PROTECTING CRITICAL INFRASTRUCTURE AND PERSONNEL 1, 56-58 (2nd ed. 2018).

187. See YORAM DINSTEIN, COLLATERAL DAMAGE AND THE PRINCIPLE OF PROPORTIONALITY, in NEW WARS, NEW LAWS? APPLYING LAWS OF WAR IN 21ST CENTURY CONFLICTS 211, 5-6 (David Wippman & Matthew Evangelista eds., 2005).

188. See Blair Kuplic and Jonathan Sawmiller, *Humanity on the Final Frontier: Challenges in Applying International Humanitarian Law to Modern Military Space Operations*, INT. REV. RED CROSS 200, 201 (2024) ("Space debris longevity, the potential for space debris to cause collisional cascading and the difficulties of creating standardized collateral damage methodology complicate proportionality analyses for kinetic and other destructive attacks") (citation omitted).

189. *Id.* ("it is challenging to effectively distinguish between civilian objects, military objectives of neutral States, and military objectives of belligerent States when targeting adversary space systems Space debris longevity, the potential for space debris to cause collisional cascading and the difficulties of creating a standardized collateral damage methodology complicate proportionality analysis for kinetic and other destructive attacks. The practical difficulties of differentiating between direct and indirect harms caused by non-kinetic actions and creating a standardized collateral effects methodology complicate civilian harm analyses for employment of non-forcible means and methods of warfare.") (citation omitted).

proportionality assessment.¹⁹⁰ Likewise, economic losses that are difficult to predict or classify typically fall outside the scope of this calculation, unless they amount to direct loss of life or physical damage to civilian property.¹⁹¹ Consequently, a range of impacts, particularly long-term, indirect (e.g., second and third order effects), or uncertain consequences remain legally relevant under the proportionality framework and likely will present complex policy challenges for decisionmakers.

The complex interplay between IHL and space law reveals significant ambiguities that challenge the clarity and applicability of international legal norms in the outer space domain. Issues surrounding sovereignty and the classification of dual-use objects expose the need to clarify interpretations of existing frameworks when applied beyond Earth's surface. As reliance on commercial satellites to support military operations increases, the difficulty in distinguishing legitimate military objectives from protected civilian infrastructure becomes more acute. This blurring of lines risks undermining core IHL principles, such as distinction and proportionality, particularly given the global interdependence on space-based services. While these ambiguities may seem abstract or academic, they carry real-world consequences for conflict prevention, accountability, and humanitarian protection. However, a more integrated and interpretive approach offers a path forward—one that ensures legal coherence without compromising the fundamental ideologies underpinning each regime.

190. See WOOMERA MANUAL, *supra* note 71, at 346 (“Fortunately, to date, the precise application of this Rule to incidental civilian losses on earth or in space during an armed conflict in space has not been determined by State practice. However, as the law of armed conflict now provides, it is clear that only those attacks may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, that would be excessive in relation to the concrete and direct military advantage anticipated are to be included in the proportionality calculation.”).

191. See Norwegian Ministry of Defence, *Manual of the Law of Armed Conflict* ¶ 2.21 (The Chief of Defence 1st ed. English-language edition 2018) (“Only losses, injuries or damage of a certain impact have to be weighed against the military advantage. These must either entail the loss of life or injury to civilians, or damage to or destruction of civilian objects.”); see also U.S. Dep’t of Def., *Law of War Manual* ¶16.5.1.1 (“In assessing incidental injury or damage during cyber operations, it may be important to consider that remote harms and lesser forms of harm, such as mere inconveniences or temporary disruptions, need not be considered in assessing whether an attack is prohibited by the principle of proportionality.”). It is important to recognize that numerous vital medical and emergency services now rely heavily on satellite communications, and any disruption to these services could lead to civilian casualties. Such disruptions, if foreseeable, should be factored into the assessment of incidental civilian harm under this principle. In a similar vein, attacks that interfere with satellite communications may also harm critical national infrastructure and other civilian sectors that depend on these systems, potentially constituting damage to civilian objects, which must also be considered in proportionality evaluations.

IV. RECONCILIATION OF REGIMES

While the importance for clarity in the legal governance of outer space during an armed conflict is evident, the path to achieving it can appear complicated by the overlapping nature of the legal regimes involved. The simultaneous application of space law and IHL creates, on face value, what appears to be a somewhat fragmented legal terrain. This fragmentation is further exacerbated by the rapid evolution of military and commercial capabilities in space, which continually test the limits of traditional legal interpretations. While these legal tensions may be portrayed as either too difficult to resolve or too distant to warrant attention, they remain practically significant, yet simultaneously capable of reconciliation through deliberate and principled interpretive efforts. In this light, the existing dominant interpretive doctrine *lex specialis*—while useful in theory—often falls short when addressing the normative tensions between these regimes in practical application. To move beyond this interpretive impasse, this Article now turns to a deeper exploration of reconciliation not through merely formal hierarchy, but through a process of harmonization grounded in the framework of systemic integration.

A. Challenges of Prioritization: *Lex Specialis*

The application of the *lex specialis* principle to the relationship between IHL and space law has garnered increasing academic and practical attention.¹⁹² Cited in several ICJ cases to resolve conflict, it also has been identified by CIL as a useful mechanism to reconcile disparate areas of international law.¹⁹³ As a general principle, *lex specialis* holds that, where two legal norms conflict, the more specific norm displaces the more general one.¹⁹⁴ Two predominant interpretative approaches can be identified. The first adopts a broad assertion that IHL constitutes the *lex specialis* in all matters relating to armed conflict.¹⁹⁵ A second, more refined approach advocates for a contextual analysis, wherein the specificity of the relevant legal provisions is assessed to determine which

192. See Int'l L. Comm'n Study Grp., *Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law*, U.N. Doc. A/CN.4/L.682 8, 68 (2006).

193. See *Threat or Use of Nuclear Weapons*, *supra* note 76, at ¶ 25.

194. See Anja Lindroos, *Addressing Norm Conflicts in a Fragmented Legal System: The Doctrine of Lex Specialis*, 74 NORDIC J. INT'L L. 27, 35 (2005).

195. See YORAM DINSTEIN AND ARNE WILLY DAHL, OSLO MANUAL ON SELECT TOPICS OF THE LAW OF ARMED CONFLICT: RULES AND COMMENTARY, Rule 4 (Springer Open 2020).

regime should prevail in a given situation.¹⁹⁶ Both of these approaches fall short of fully addressing the complexities that come with interpreting various international laws together.

For the first approach, it is often grounded in the position articulated by the International Law Commission (ILC), which, in its study of legal obligations during armed conflict and their relationship with treaty law, characterized IHL as the *lex specialis* governing the conduct of hostilities in outer space.¹⁹⁷ However, this blanket application of the doctrine overlooks important complexities. One such complexity lies in determining which legal regime is, in fact, more specific. IHL regulates the substantive conduct of armed conflict, while space law is concerned with the spatial context in which such conflict may occur.¹⁹⁸ The distinct focus of each regime makes it difficult to assert a clear hierarchy of specificity. Moreover, this ambiguity is compounded by broader critiques of the *lex specialis* doctrine itself. Scholars have argued that the principle is only applicable where both the general and specific provisions address the same substantive issue.¹⁹⁹ As Anja Lindroos notes:

[L]ex specialis is a suitable approach to the resolution of conflicts between treaties when a connection exists between those treaties. Its application is not automatic and does not solve conflicts between two special norms, however, especially if these derive from different normative orders. The maxim of *lex specialis* does not provide any criteria to guide the decision whether one area of law is generally more important than another.²⁰⁰

Accordingly, *lex specialis* alone cannot determine which legal framework, space law or IHL, is more specific in the context of armed conflict in outer space. Its utility remains primarily confined to situations involving overlapping substantive content.²⁰¹ Moreover, the doctrine does not provide any criteria for evaluating whether one area of law should be considered more authoritative or significant than another.

196. See Dale Stephens, *The International Legal Implications of Military Space Operations: Examining the Interplay Between International Humanitarian Law and the Outer Space Legal Regime*, 94 INT'L L. STUD. 75, 92 (2018).

197. See Draft Articles on the Effects of Armed Conflicts on Treaties, with Commentaries, [2011] 2 Y.B. INT'L L. COMM'N 2, U.N. Doc. A/66/10, ¶ 110 (2011).

198. See Steven Van De Put and Anne-Rixt E Siemensma, *A Giant Leap for Humankind: Bridging Space Law and International Humanitarian Law*, 62 MIL. L. & L. WAR REV. 31, 31 (2024).

199. See Gerald Fitzmaurice, *The Law and Procedure of the International Court of Justice 1951-4: Treaty Interpretation and Other Treaty Points*, 33 BRIT. Y.B. INT'L L. 203, 237 (1957).

200. See Lindroos, *supra* note 194, at 44.

201. See Van De Put, *supra* note 198, at 44-46.

Scholarly commentary analyzing the ICJ's advisory opinion in the *Legality of the Threat or Use of Nuclear Weapons* echoed the aforementioned critique.²⁰² Commentators have contended that the Court did not invoke *lex specialis* as the basis for its reasoning, but instead, employed broader interpretative tools grounded in systemic integration (as to be discussed later).²⁰³ A closer examination of the opinion reveals that, rather than prioritizing one regime over another on the basis of specificity, the Court sought a reconciliatory interpretation that accommodates both legal frameworks. Specifically, the right to life under international human rights law was interpreted in light of the operational context of armed conflict. Here, IHL was implemented to inform, rather than override, human rights norms.²⁰⁴ Aligned with the principle of reconciliation, this decision tried to ensure coherence across international legal obligations. The rendering further suggests that even when *lex specialis* is acknowledged, it does not necessarily imply that the more specific norm supersedes the general one. Instead, the jurisprudence reflects an effort to integrate and harmonize obligations arising under different legal regimes.

From a legal perspective, criticisms of *lex specialis* are reinforced by its absence from the core treaty interpretation rules.²⁰⁵ Notably, it is not codified as a general rule of interpretation within the Vienna Convention on the Law of Treaties (VCLT).²⁰⁶ Rather, *lex specialis* is often invoked as an interpretative technique rather than a binding norm. For instance, it appears in the context of the Articles on the Responsibility of States for Internationally Wrongful Acts.²⁰⁷ Furthermore, this interpretative method is not expressly mentioned in the foundational texts of either the OST or the key instruments of IHL. Following this, some scholars note this absence of explicit reference to suggest that *lex specialis* may not provide an adequate or authoritative framework for resolving interpretive tensions between these two legal regimes.²⁰⁸

Addressing the second approach, the application of *lex specialis* to entire legal regimes has also faced criticism. This is particularly due to the

202. *Id.*

203. See Vito Todeschini, *The ICCPR in Armed Conflict: An Appraisal of the Human Rights Committee's Engagement with International Humanitarian Law*, 35 NORDIC J. HUM. RTS. 203, 209 (2017).

204. *Id.*

205. See Van De Put, *supra* note 198, at 45-46.

206. See Vienna Convention, *supra* note 116, at art. 31(1).

207. As opposed to, for example, rules surrounding the responsibility of states. See Draft Articles on Responsibility of States for Internationally Wrongful Acts, U.N. GAOR, 56th Sess., U.N. Doc. A/56/10 (2001), art. 55.

208. See Lindroos, *supra* note 194, at 44.

inherent difficulty of definitively determining which legal framework is more specific in every context.²⁰⁹ Given this concern, a more refined approach has been suggested to shift the focus from overarching bodies of law to identifying particular obligations, and only then assessing which norm is more specific in relation to the issue at hand.²¹⁰ However, even this refined approach does not fully address the broader critiques associated with *lex specialis* as a method of interpretation. A central ambiguity that persists is whether interpretive priority should be given to the substance of the legal obligation or to the spatial or functional domain in which the obligation operates. This dilemma is exemplified by Terry Gill who posits:

[W]hy should the fact that there was an international armed conflict underway give either party a right to target spacecraft and satellites in such a way as to seriously impair the peaceful use of outer space for an indefinite period of time as a result of uncontrollable effects of space debris?²¹¹

This example highlights the interpretive conflict between two specific legal norms: The first is the permissibility of collateral damage under IHL, and the second is the principle of the peaceful use of outer space under the space legal regime. Determining which obligation should be considered more specific revives many of the same challenges associated with applying *lex specialis* to entire legal regimes. Both norms possess a degree of specificity, but within distinct contexts, where one is substantive and the other spatial.²¹² Consequently, shifting the analysis to specific obligations does not resolve the fundamental tension, nor does it provide a clear interpretive pathway for reconciling these obligations.

B. Systemic Integration: Harmonizing Legal Regimes

This section of the Article is divided into two parts. The first examines the principle of systemic integration in international law, focusing on how legal regimes can be harmonized through interpretative methods that align with broader international legal frameworks. Drawing on Article 31(3)(c) of the VCLT, it discusses how conflicts between treaties can be resolved by considering their context within the larger

209. See Van De Put, *supra* note 198, at 44.

210. *Id.*

211. See Terry Gill, *Rethinking the Scope of Application of International Humanitarian Law and Its Place in the International Legal System*, 60 MIL. L. & L. WAR REV. 58, 69 (2022).

212. See Marko Milanović, *The Lost Origins of Lex Specialis: Rethinking the Relationship Between Human Rights and International Humanitarian Law*, in THEORETICAL BOUNDARIES OF ARMED CONFLICT AND HUMAN RIGHTS 107-17 (J. David Ohlin ed., Cambridge Univ. Press 2016).

international legal system. The second part applies this principle to the unique challenges of proportionality in armed conflicts in outer space. It explores how IHL's proportionality principle must be adapted to account for the long-lasting and global environmental effects of military actions in space, particularly the creation of space debris. By integrating IHL with space law, this section argues for a more sustainable approach to military operations in space, ensuring the protection of both space infrastructure and the broader space environment.

1. Principles of Systemic Integration in International Law

In the field of international law, there is a well established presumption against normative conflict.²¹³ Carried over into international judicial reasoning, in the *Right of Passage over Indian Territory* case, the ICJ stated: "It is a rule of interpretation that a text emanating from a Government must, in principle, be interpreted as producing and as intended to produce effects in accordance with existing law and not in violation of it."²¹⁴ The process of interpreting treaties is inherently diplomatic, and a central aim of diplomacy is to prevent or reduce conflict.²¹⁵ Charles Rousseau notes in one of the earliest and still influential discussions on the issue of treaty conflict: "*lorsqu'il est en présence de deux accords de volontés divergents, il doit être tout naturellement porté à rechercher leur coordination plutôt qu'à consacrer leur antagonisme.*"²¹⁶ Translated into English, this outlines that when faced with two treaties that differ in intent, the judge must be inclined to seek to reconcile them, rather than entrench their divergences.²¹⁷ This interpretive approach has evolved into a widely endorsed principle, often articulated in the assumption that, when entering into new legal commitments, states do not intend to override or undermine their existing obligations.²¹⁸

213. See RHONDA FERGUSON, THE RIGHT TO FOOD AND THE WORLD TRADE ORGANIZATION'S RULES ON AGRICULTURE: CONFLICTING, COMPATIBLE, OR COMPLEMENTARY? 51-97 (2017).

214. See *Right of Passage over Indian Territory* (Port. v. India), 1957 I.C.J. 6 ¶ 21 (Nov. 26th). The ICJ interpreted Portugal's declaration on the acceptance of compulsory jurisdiction of the ICJ in conformity with international law.

215. See for example, Anne Peters, *The Refinement of International Law: From Fragmentation to Regime Interaction and Politicization*, 15 INT'L J. CONST. L. 671, 690 (2017).

216. See Charles Rousseau, *De la compatibilité des normes juridiques contradictoires dans l'ordre international*, 39 RENVUE GENERALE DE DRIOT INTERNATIONAL PUBLIC 133, 153 (1932).

217. See ILC Study Group, *supra* note 192, at 15.

218. OPPENHEIM'S INTERNATIONAL LAW 1, 1275 (Robert Jennings & Arthur Watts eds., 9th ed. 1992).

Avoiding formal declarations of treaty incompatibility is often motivated by both legal and political considerations in international law. A clear example is the *Austro-German Customs Union* case of 1931,²¹⁹ where the Permanent Court of International Justice found that Austria's planned customs union with Germany breached its treaty obligations under the Treaty of Versailles²²⁰ and the Treaty of Saint-Germain.²²¹ Judge Anzilotti highlighted the inherently political nature of the issue, questioning the legal criteria by which such a union, deeply entangled in historical and regional politics, could be evaluated in terms of Austria's independence.²²² As he noted, "What legal standards were there to instruct on whether a customs union between Austria and Germany . . . would encroach on Austria's independence?"²²³ In this context, legal incompatibility was inseparable from political judgment, illustrating how formal statements of conflict may not only be inappropriate, but also diplomatically counterproductive.

The tendency to preserve the validity of norms even when they are set aside is a key feature of international legal practice, with *jus cogens* remaining a notable exception.²²⁴ Rather than rendering conflicting norms void, international law typically employs two principal strategies. First, there is the harmonization of apparently conflicting rules through interpretative techniques. Second, there is the use of prioritization, allowing the subordinated norm to remain legally relevant, albeit in the background.²²⁵ This approach avoids legal nullification and reinforces the integrity of international law's normative structure. Underscoring the inseparability of interpretation from conflict resolution, whether a conflict exists, and how it is addressed, is itself a product of interpretative

219. Customs Regime between Germany and Austria, Advisory Opinion, Sep. 5, 1931, 1931 P.C.I.J. (ser. A/B) No. 41 at 53 [hereinafter *Austro-German Customs Union*].

220. Treaty of Peace Between the Allied and Associated Powers and Germany, June 28, 1919, 225 Consol. T.S. 188.

221. Treaty of Peace Between the Allied and Associated Powers and Austria, Sep. 10, 1919, 225 Consol. T.S. 188.

222. See *Austro-German Customs Union*, *supra* note 219, at 55, 57.

223. *Id.*

224. Where harmonization fails, priority may be established through the principles of *lex specialis*, which prioritizes specific norms over general ones; *lex posterior*, which gives precedence to the more recent norm; or superior norm status, where peremptory norms (*jus cogens*) or norms like Article 103 of the U.N. Charter override conflicting rules. These principles help resolve conflicts between international legal norms by determining which rule should take precedence in specific situations. See ILC Study Group, *supra* note 192, at 48.

225. *Id.*

reasoning.²²⁶ Apparent incompatibilities may be mitigated or resolved altogether by reading the relevant norms in light of shared systemic objectives.²²⁷ Tools such as the principles of effectiveness,²²⁸ good faith,²²⁹ ordinary meaning,²³⁰ and object and purpose²³¹ guide this process.

Through this lens, the prerogative is that law is not merely a set of rules, but rather an ongoing interpretative process.²³² Here, meaning is not derived only from the literal textual writings of treaties and statutes, but also from the underlying climate from which those texts are informed. As such, this concept conveys that the spirit and purpose underpinning a legal

226. JOOST PAUWELYN, *CONFLICT OF NORMS IN PUBLIC INTERNATIONAL LAW: HOW WTO LAW RELATES TO OTHER RULES OF INTERNATIONAL LAW* 240-244 (Cambridge Univ. Press 2003).

227. See Stephens, *supra* note 196, at 82.

228. Also referred to as *ut res magis valeat quam pereat*, this principle aims to give effect to the provisions of a treaty in a way that ensures they are meaningful and operational. The idea is that a treaty should be interpreted in a manner that preserves its purpose and ensures that it has practical impact. If a certain interpretation of a treaty provision would render it ineffective or meaningless, this interpretation is avoided in favor of one that preserves the intent and purpose of the treaty. For example, if a treaty provision is ambiguous and one interpretation would make the provision practically useless, the interpretation that preserves the effectiveness of the provision would be preferred. See Aaron X. Fellmeth and Maurice Horwitz, *Ut Res Magis Valeat Quam Pereat*, *GUIDE TO LATIN IN INTERNATIONAL LAW* (2nd ed. 2022).

229. Also referred to as *pacta sunt servanda*, the principle of good faith holds that treaties must be interpreted and implemented in good faith, meaning that states must abide by the commitments they have made under the treaty. Good faith ensures that parties act in a way that reflects the intent and spirit of the agreement, not just the literal text. For example, if a treaty states that parties will cooperate in certain areas, but one party is acting in bad faith by deliberately obstructing that cooperation, this would be seen as a violation of the principle of good faith. See Anthony Aust, *Pacta Sunt Servanda*, *MAX PLANCK ENCYCLOPEDIAS OF INTERNATIONAL LAW* (2007).

230. See Vienna Convention, *supra* note 116, at art. 31(1). The principle of ordinary meaning, as codified in Article 31(1) of the VCLT, requires that the terms of a treaty be given their ordinary or plain meaning unless the context or the treaty's object and purpose suggest otherwise. This means that the text of the treaty is the primary source of interpretation, and words are understood as they would be in normal usage. For example, if a treaty uses the word "state," the ordinary meaning would generally refer to a sovereign country. Only if the context or purpose of the treaty suggests otherwise should this interpretation be altered.

231. See Vienna Convention, *supra* note 116, at art. 31. This principle stresses that treaties should be interpreted in light of their object and purpose. If the text of a treaty is ambiguous or unclear, interpreters should look to the overall goals or objectives that the treaty aims to achieve in order to resolve the ambiguity. The object and purpose of the treaty provide context that helps determine the meaning of specific provisions. For example, in a treaty designed to protect human rights, if a provision is unclear, it should be interpreted in a way that furthers the protection of human rights, reflecting the treaty's overall goal.

232. See Vassilis Tzevelekos, *The Use of Article 31(3)(c) of the VCLT in the Case Law of the ECtHR: An Effective Anti-Fragmentation Tool or a Selective Loophole for the Reinforcement of Human Rights Teleology?*, 31 MICH. J. INT'L L. 621, 624 (2010).

framework are imperative for its efficient application.²³³ This requires examining the historical and political context in which laws were created, understanding the values they aimed to uphold, and recognizing how those values might evolve. As such, there is a constant fit and justification process.²³⁴ Fit pertains to ensuring that interpretations align with existing legal materials.²³⁵ Justification mandates demonstrating that those interpretations are morally and rationally defensible, promoting a coherent and just legal system.²³⁶ As such, harmonization offers a potential solution through locating unifying themes with a contextual interpretation.

Coined by Campbell McLachlan, the application of “harmonization” is also more formally recognized as the termed principle “systemic integration,” whereby individual treaty obligations are contextualized within the broader international legal system.²³⁷ Initially analyzed by the ILC’s Fragmentation of International Law study,²³⁸ this integrative approach was formalized in Article 31(3)(c) of the VCLT, which requires that treaty interpretation “shall be taken into account, together with the context . . . [of a]ny relevant rules of international law applicable in the relations between the parties.”²³⁹ The rationale behind systemic integration is clear. Treaty obligations derive their validity from general international law and operate alongside other treaty-based and customary norms. None inherently supersedes the other. Rather, their relationship must be understood through interpretative reasoning aimed at achieving coherence.²⁴⁰ As Sir Arnold McNair emphasized, treaty provisions must be interpreted “against the background of the general principles of international law.”²⁴¹ As such, this facilitated a more holistic and systematic reading of treaties within their broader normative context.

Both state practice and judicial interpretations across a broad range of international legal regimes underscore the enduring significance of

233. See Campbell McLachlan, *The Principle of Systemic Integration and Article 31(3)(c) of the Vienna Convention*, 54 INT’L & COMP. L. Q. 279, 286 (2005).

234. See generally, Ronald Dworkin, *Law’s Empire* 1, 128 (1986).

235. *Id.*

236. See Matthew Stubbs, *Human Rights Obligations as a Collateral Limit on the Powers of the Security Council in Imagining Law: Essays in Conversation with Judith Gardam* 61, 67-68 (Dale Stephens & Paul Babie eds., 2018).

237. See McLachlan, *supra* note 233, at 280.

238. See ILC Study Group, *supra* note 192, at 208.

239. See Vienna Convention, *supra* note 116, at art. 31(3)(c).

240. See GUTHNER TEUBNER, *CONSTITUTIONAL FRAGMENTS: SOCIETAL CONSTITUTIONALISM IN GLOBALIZATION*, 161-162 (2012).

241. See ARNOLD MCNAIR, *THE LAW OF TREATIES*, 466 (1986).

Article 31(3)(c) of the VCLT. For instance, in World Trade Organization (WTO) jurisprudence, the Appellate Body has consistently relied on this article to promote interpretive coherence with general international law. In *Appellate Body Report, United States—Import Prohibition of Certain Shrimp and Shrimp Products*,²⁴² the Appellate Body considered the relevance of international environmental agreements in interpreting WTO obligations under Article XX of the General Agreement on Tariffs and Trade.²⁴³ Likewise, in *Appellate Body Report, European Communities—Measures Affecting the Approval and Marketing of Biotech Products*,²⁴⁴ the Appellate Body underscored the importance of integrating international legal norms, including those outside the WTO framework, when interpreting member obligations.²⁴⁵ Similarly, international human rights bodies, including the European Court of Human Rights (ECtHR) and the Inter-American Court of Human Rights, have adopted teleological interpretations grounded in the principle of *effet utile*.²⁴⁶ Even more so, the ECtHR has emphasized this approach in cases such as *Tyrer v. United Kingdom*, stating that the European Convention on Human Rights is a “living instrument”²⁴⁷ to be interpreted in light of present-day conditions. These bodies frequently incorporate Article 31(3)(c) to ensure that their foundational treaties are interpreted in a way that reflects both contemporary developments and the broader corpus of international human rights law.²⁴⁸ Thus, Article 31(3)(c) has proven to be a critical interpretive tool across diverse legal regimes, reinforcing a move toward systemic integration and enabling treaty interpretation that is both normatively coherent and contextually sensitive.²⁴⁹

Even prior to the formal adoption of the VCLT in 1969, international tribunals applied interpretive approaches consistent with what is now codified in Article 31(3)(c). For example, in the *Georges Pinson* case, the French-Mexican Claims Commission interpreted a bilateral agreement by

242. Appellate Body Report, *United States—Import Prohibition of Certain Shrimp and Shrimp Products*, WTO Doc. WT/DS58/AB/R (adopted Oct. 12, 1998).

243. General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A-11, 55 U.N.T.S. 194.

244. Appellate Body Report, *European Communities—Measures Affecting the Approval and Marketing of Biotech Products*, WTO Doc. WT/DS291/AB/R (adopted Nov. 21, 2006).

245. *Id.*

246. See Lucas Lixinski, *Treaty Interpretation by the Inter-American Court of Human Rights: Expansionism at the Service of the Unity of International Law*, 21 EUR. J. INT'L L. 585, 589 (2010).

247. *Tyrer v. United Kingdom*, App. No. 5856/72 1, 15-16 (Apr. 25, 1978), <https://hudoc.echr.coe.int/fre?i=001-57587>.

248. See ILC Study Group, *supra* note 192, at 48-49.

249. See Dworkin, *supra* note 234.

reference to general principles of international law and customary norms, rejecting strict adherence to domestic law and asserting its independent competence to interpret treaty terms in accordance with broader legal principles.²⁵⁰ Similarly, in the *Southern Bluefin Tuna* case, the Tribunal acknowledged that “more than one treaty” often governs a single dispute and that parallel treaties must be interpreted together. Evident in the debate over jurisdictional overlap between the United Nations Convention on the Law of the Sea (UNCLOS) and regional fisheries treaties, this practice extends to framework and implementation treaties, where interpretation requires attention to their interrelation.²⁵¹ In another case, the European Court of Human Rights rejected the United Kingdom’s use of *lex specialis* for IHL to bar jurisdiction under the European Convention on Human Rights (ECHR) in *Hassan v. United Kingdom*.²⁵² Rather, the Court proclaimed that “in situations of international armed conflict, the safeguards under the Convention continue to apply, albeit interpreted against the background of the provisions of [IHL].”²⁵³ As such, the Court interpreted the relevant ECHR provision in light of a comparable IHL provision, resonating with systemic integration to treat seemingly individual parts of the law as one coherent legal theory.

Admittedly, while systemic integration offers a practical path for reconciling treaty obligations, its utility has limits. As one commentator notes, “[it] may resolve apparent conflicts; it cannot resolve genuine conflicts.”²⁵⁴ The willingness of states to harmonize depends on the extent of divergence between their interests.²⁵⁵ Where such divergence is profound, harmonization may be perceived as requiring undue

250. Georges Pinson (Fr. v. Mex.), 5 R.I.A.A. 327, 422 (Fr.-Mex. Claims Comm’n 1928). In practice, the interpretative reliance on general international law is routine, even implicit, particularly within specialized regimes where baseline rules—such as *audiatur et altera pars* or the legal status of statehood—are assumed unless directly contested.

251. Lan Ngoc Nguyen, *Expanding the Environmental Regulatory Scope of UNCLOS Through the Rule of Reference: Potentials and Limits*, 52 OCEAN DEV. & INT’L L., 419, 420 (2021) (“When UNCLOS was concluded in 1982, it did not come into being in a vacuum; there already existed at the time multiple treaties regulating more specific issues of the law of the sea. The ‘rule of reference’ takes cognizance of the existence of these instruments and incorporates them into UNCLOS.”).

252. See generally, *Hassan v. United Kingdom*, App. No. 29750/09 ¶ 93 (Sep. 16, 2014), <https://hudoc.echr.coe.int/fre?i=001-146501>.

253. *Id.* at ¶ 104.

254. See ILC Study Group, *supra* note 192, at 27.

255. *Id.*

compromise, particularly by weaker parties.²⁵⁶ Thus, even where formal rights and obligations are clearly defined, caution must be exercised in treating them as flexible tools for negotiation. In such cases, systemic integration may risk obscuring rather than resolving power imbalances, reinforcing inequities under the guise of legal coherence. Additionally, over-reliance on integration can mask fundamental normative disagreements between legal regimes, delaying necessary reforms or the articulation of clearer rules.²⁵⁷ Therefore, while systemic integration is a valuable interpretive method, it must be employed with a critical awareness of its political and structural limitations.

Article 31(3)(c) has also drawn criticism for ambiguity, particularly regarding its temporal and normative scope, as it expresses a necessary aspect of international legal reasoning. However, *Gabčíkovo-Nagymaros* noted that the principle it embodies remains essential to resolving conflicts and preserving coherence across the increasingly complex network of international legal obligations, even imperfectly articulated.²⁵⁸ In general, criticisms do not negate the coherent application of IHL to space law in an armed conflict from being necessary. In cases concerning ECHR and the law of sovereign immunity, the ECtHR outlined in *Al-Adsani v. United Kingdom*,²⁵⁹ *Fogarty v. United Kingdom*,²⁶⁰ and *McElhinney v. Ireland*²⁶¹ that the Articles of ECHR cannot be interpreted in a vacuum, that it must take into account the rules of international law, and that the ECHR should be interpreted in harmony as much as possible. While these rulings are not binding on other states, they highlight the necessity to commence identifying themes shared by IHL and space law to determine how each should apply each instance.

256. See Christopher Borgen, *Resolving Treaty Conflicts*, 37 GEO. WASH. INT'L L. REV. 573, 640 (2005).

257. See Adamantia Rachovista, *The Principle of Systemic Integration in Human Rights Law*, 66 INT'L & COMPAR. L. Q. 557, 581 (2017).

258. For the Treaty concerning the Construction and Operation of the Gabčíkovo-Nagymaros System of Locks, signed at Budapest on 16 September 1977, see Treaty Concerning the Construction and Operation of the Gabčíkovo-Nagymaros System of Locks, Hung.-Czech, Sep. 16, 1977, 1109 U.N.T.S. 17134.

259. *Al-Adsani v. United Kingdom*, App. No. 35763/97 ¶ 55 (Nov. 21, 2001), <https://hudoc.echr.coe.int/eng?i=001-59885>.

260. *Fogarty v. United Kingdom*, App. No. 37112/97 ¶ 35 (Mar. 1, 2000), <https://hudoc.echr.coe.int/eng?i=001-5226>.

261. *McElhinney v. Ireland*, App. No. 31253/96 ¶ 36 (Nov. 21, 2001), <https://hudoc.echr.coe.int/fre?i=001-59887>.

2. Case Application: Proportionality Principles of Armed Conflicts in Outer Space

The OST confers upon outer space a special status as a domain of shared interest and collective stewardship, mandating its exploration and use serve the benefit all countries, regardless of development status.²⁶² As Article III of the OST incorporates international law into the conduct of space activities, this provision establishes a juridical bridge between IHL and space law, thereby requiring that the conduct of hostilities in space comply not only with established military legal standards, but also with the environmental protections and cooperative obligations inherent in the governance of outer space.²⁶³ In this context, the proportionality assessment of attacks involving ASAT weapons acquires particular significance. Unlike conventional terrestrial weaponry, kinetic operations in space generate enduring orbital debris, which may remain in orbit for decades or even centuries.²⁶⁴ Such debris may pose indiscriminate risks to all space infrastructure, constituting a transboundary and intergenerational hazard that threatens both civilian and military operations.

Moreover, outer space is unique in that, pursuant to Article II of the OST, no state may assert sovereignty.²⁶⁵ In the absence of territorial control, the responsibility for environmental protection becomes inherently collective,²⁶⁶ thereby heightening the imperative for restraint in military conduct. Unlike terrestrial environments, where the effects of harm may be geographically contained, space debris is inherently transboundary in nature; it respects no borders and is not subject to any centralized regime for accountability, remediation, or redress.²⁶⁷ This

262. See Hugh Thirlway, *The Law and Procedure of the International Court of Justice 1960-1989 (Part Three)*, 62 BRIT. Y.B. INT'L L. 1, 58 (1991).

263. See Wen Zhou, *Protection of Civilians, Civilian Objects and the Natural Environment in Relation to Threats Arising from State Behaviours with Respect to Outer Space*, Presentation to Open-ended Working Group on Reducing Space Threats Through Norms, Rules and Principles of Responsible Behaviours, INT'L COMM. OF THE RED CROSS (2022).

264. See generally Michael Krepon, et al., *Preserving Freedom of Action in Space: Realizing the Potential and Limits of U.S. Spacepower*, Stimson Ctr. Rep. No. 66 1, 2-3 (2007).

265. Article II states that, "Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." See OST, *supra* note 8, at art. II.

266. See generally Joseph Kurt, *Triumph of the Space Commons: Addressing Impending Space Debris Crisis Without an International Treaty*, 40 WM. & MARY L. & POL'Y REV. 305, 313 (2015).

267. See generally, Daniel Lambach and Lena Wesel, *Tackling the Space Debris Problem: A Global Commons Perspective*, Proceedings of the 8th Eur. Conf. on Space Debris (2021).

legal vacuum renders preventative obligations all the more critical under both IHL and space law. In integrating the precautionary principle to take feasible measures to minimize incidental harm with the OST's environmental provisions, this implies that parties should take technological, operational, or doctrinal steps to avoid creating debris.²⁶⁸ Feasible alternatives to the creation of debris where plausible must be rendered justifiable under a systemically integrated legal interpretation.²⁶⁹

While the high seas are likewise classified as a global commons under the UNCLOS, the emphasis on environmental protection within outer space law appears to be more pronounced and robust for several reasons. The preamble of the OST establishes a normative framework that prioritizes the collective benefit and peaceful use of outer space, therefore implying a duty to safeguard this shared domain for all humanity, including future generations.²⁷⁰ This normative orientation is reinforced in Article I of the OST, which affirms that the exploration and use of outer space shall be conducted for the benefit and in the interests of all countries, regardless of their level of economic or scientific development, and that outer space is "the province of all [hu]mankind."²⁷¹ These provisions articulate a standard of shared stewardship, which necessarily extends to the preservation of the outer space environment. This obligation is further reinforced by the due regard principle codified in Article IX of the OST.²⁷² In contrast, although UNCLOS includes environmental protection provisions, particularly in Part XII, its

268. The precautionary principle, while not explicitly mentioned in the Outer Space Treaty (OST), is closely related to its environmental provisions. The OST, particularly Article IX, emphasizes avoiding harmful contamination and interference in outer space, which aligns with the core idea of the precautionary principle: acting to prevent potential harm even if there's scientific uncertainty. The treaty also calls for international consultations before potentially harmful activities, further supporting a precautionary approach. *See* OST, *supra* note 8, at art. IX.

269. *See for example*, Aaron Bateman, Commentary, *America Can Protect its Satellites Without Kinetic Space Weapons*, WAR ON ROCKS (2020).

270. The Preamble states "The States Parties to this Treaty, recognizing the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes, believing that the exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development, desiring to contribute to broad international co-operation in the scientific as well as the legal aspects of the exploration and use of outer space for peaceful purposes, believing that such co-operation will contribute to the development of mutual understanding and to the strengthening of friendly relations between States and peoples . . ."). *See* OST, *supra* note 8.

271. *See* OST, *supra* note 8, at art. I.

272. The due regard principle is a key element of Article IX of the Outer Space Treaty (1967). It requires that states, in conducting space activities, respect the interests of other states. In essence, states must not act in ways that would cause harm or interfere with the space activities of others, and they should actively consider the potential impacts of their actions on the broader international community. *See* OST, *supra* note 8, at art. IX.

framework frequently balances these obligations against competing principles, such as the freedom of navigation and the right to exploit marine resources.²⁷³ While obligations to prevent marine pollution are recognized, the legal regime governing the high seas may not impose environmental protection as a foundational or overriding prerequisite in the same way that the OST does in relation to space activities.

As discussed earlier, the principle of proportionality presents unique challenges when applied to armed conflict in outer space, particularly due to the distinctive characteristics of the space environment. A fundamental tenet of IHL, this principle becomes especially complex when considering the environmental impact of military actions. Codified in Articles 51(5)(b) and 57(2)(b) of Additional Protocol I to the Geneva Conventions,²⁷⁴ the principle prohibits attacks that are expected to cause incidental civilian harm if such harm would be disproportionate to the anticipated military advantage. While proportionality has traditionally been applied to terrestrial conflicts, its application in outer space, particularly in scenarios involving kinetic military action, raises novel legal concerns. The long-term, non-localized, and systemic nature of space debris introduces unique complexities,²⁷⁵ as the consequences of military actions in space can have far-reaching effects on both civilian and military operations over extended periods.

Legal scholars and interpretive guidance under IHL, such as the ICRC's Commentary on the Additional Protocols, emphasize that proportionality assessments must account for all foreseeable harm,

273. See United Nations Convention on the Law of the Sea, *supra* note 134, at arts. 56(1)(a), 77(1), 87(1)(a), and 90. UNCLOS recognizes key maritime freedoms and sovereign rights that often operate in tension with environmental protection obligations. Under Article 87(1)(a), all states enjoy the freedom of navigation on the high seas, and Article 90 reinforces this by affirming the right of every state to sail ships under its flag in those areas. At the same time, coastal states are granted specific sovereign rights over maritime resources: Article 56(1)(a) provides that within the exclusive economic zone, coastal states may explore, exploit, conserve, and manage natural resources, while Article 77(1) extends similar rights over the continental shelf, even without occupation or explicit declaration. These provisions reflect a careful balance between preserving maritime freedoms and allowing states to benefit from adjacent marine resources.

274. See Additional Protocol I, *supra* note 90, at 52(5) and 57(2)(b). This obligation is codified in Articles 51(5)(b) and 57(2)(b) of Additional Protocol I to the Geneva Conventions, which establish the requirement to avoid attacks that may cause excessive incidental harm to civilians or civilian objects in relation to the concrete and direct military advantage anticipated, and to take all feasible precautions in attack to minimize such harm.

275. See Arjen Vermeer, *The Laws of War in Outer Space: Some Legal Implications for Jus ad Bellum and Jus in Bello of the Militarisation and Weaponisation of Outer Space*, in THE NEW ORDER OF WAR 69, 75 (B. Brecher, Brill 2010).

including both immediate effects and long-term consequences.²⁷⁶ In outer space, this obligation assumes distinctive significance. Foreseeable consequences include the creation of persistent debris fields, which threaten satellites, disrupt vital communication systems, and may deny access to orbital regimes for decades or centuries.²⁷⁷ These effects are not merely speculative, but remain grounded in well-established scientific models of debris generation and collision cascades, commonly referred to as the Kessler Syndrome.²⁷⁸ Therefore, the proportionality principle in outer space must extend beyond traditional civilian harm to include environmental damage affecting the global space domain. This broader approach ensures that military advantage is weighed not only against short-term physical destruction but also against the enduring risks to the sustainability and usability of space for all humankind.²⁷⁹

The interpretive framework of systemic integration under Article 31(3)(c) of the VCLT provides a method for interpreting IHL in light of relevant space law. Article 31(3)(c) mandates that treaty terms be interpreted “in light of any relevant rules of international law applicable in the relations between the parties.”²⁸⁰ This approach calls for a contextual and comprehensive reading of legal obligations, ensuring that treaties are not interpreted in isolation but within the broader corpus of international law. As such, the principle of proportionality in IHL must be understood in the context of environmental protection obligations under space law. Article IX of the OST is particularly significant in this regard, as it requires states to conduct space activities “with due regard to the corresponding interests of all other States Parties”²⁸¹ and to avoid “harmful contamination”²⁸² of space and adverse environmental effects

276. *Id.*; see also *Summary of the Geneva Conventions of 1949 and Their Additional Protocols*, *supra* note 17; see also *Weapons: ICRC Statement to the United Nations, 2015*, *supra* note 72.

277. See Kuplic, *supra* note 188, at 29.

278. The Kessler effect describes a scenario in which the accumulation of orbital debris reaches a critical density, particularly in low Earth orbit. In such a situation, collisions between satellites and debris fragments can generate even more debris, increasing the likelihood of subsequent collisions in a self-sustaining chain reaction. This cascading process could eventually make certain orbital regions unusable, even if no additional debris were introduced from this point forward, underscoring the long-term consequences of current space operations. See Donald J. Kessler and Burton G. Cour-Palais, *Collision Frequency of Artificial Satellites: The Creation of a Debris Belt*, 83 J. GEOPHYSICS RSCH. 2637, 2367 (1978).

279. See TALLINN MANUAL, *supra* note 122, at 415; see also DoD MANUAL, *supra* note 80, at 1034.

280. See Vienna Convention, *supra* note 116, at art. 31(3)(c).

281. See OST, *supra* note 8, at art. IX.

282. *Id.* While this Article defines “harmful contamination” precisely, this provision implies that states should take precautions to prevent space activities from causing negative effects

on Earth. Legal scholarship has widely interpreted the term *harmful contamination* to encompass space debris, which impedes the free use and exploration of outer space.²⁸³ Given that space debris impacts all space users, its creation through military means could result in civilian harm on a collective, domain-wide scale, thus extending the scope of civilian objectives in IHL beyond traditional conceptions.

This interpretation aligns with the jurisprudence of the ICJ, particularly in its *Nuclear Weapons Advisory Opinion*, which affirmed that environmental considerations are integral to the legality of military conduct under IHL, even in times of armed conflict.²⁸⁴ The ICJ emphasized that environmental obligations persist during wartime and must be integrated into the conduct of hostilities.²⁸⁵ When applied to outer space, this principle reinforces the argument that proportionality assessments under IHL must account for the systemic environmental harm caused by kinetic actions.²⁸⁶ The proactive duty to prevent harmful contamination and adverse changes in outer space underscores the environmental imperative inherent in space activities. While such obligations are also present in other global commons regimes, they are particularly central and explicitly articulated in space law. Following this discussion, feasible alternatives to kinetic weapons, such as cyber or electronic attacks that do not produce physical debris,²⁸⁷ are therefore legally preferable and more justifiable under a systemic integration framework.

In summary, the application of the principle of proportionality in outer space armed conflicts introduces complex legal and environmental challenges owing to the unique nature of the space domain. The enduring, transboundary, and irreversible consequences of space debris necessitate an interpretation of IHL that extends beyond traditional notions of civilian

on the space environment (such as the spread of harmful microorganisms or other forms of contamination) or on Earth's environment (such as harmful space debris entering Earth's atmosphere). The interpretation of "harmful contamination" has been further explored by international space law experts and space agencies, especially in terms of planetary protection protocols and the handling of spacecraft to prevent biological contamination of other planets.

283. See Kuplic, *supra* note 188, at 31; see also Van De Put, *supra* note 198, at 45.

284. See *Threat or Use of Nuclear Weapons*, *supra* note 76, at ¶¶ 28-30. The Court discussed the environmental impact of nuclear weapons, recognizing that the use of nuclear weapons could result in harmful contamination of the environment, a concern closely related to the obligations in Article IX of the OST. In the context of space law, the principles established in that opinion may inform the interpretation of "harmful contamination" as a precaution against space activities that could similarly result in environmental damage, both in space and on Earth.

285. *Id.* at ¶¶ 29-33.

286. See Stephens, *supra* note 196, at 82.

287. See Bateman, *supra* note 269.

harm to encompass the broader, intergenerational environmental risks. Through the interpretive framework of systemic integration under Article 31(3)(c) of the VCLT, the environmental obligations embedded in the OST, particularly the duty to prevent harmful contamination, must shape and limit the lawful use of force in space. By harmonizing IHL with space law, states are urged to adopt a precautionary and sustainability-oriented approach to military operations in orbit, prioritizing and favoring where possible non-kinetic methods that minimize harm and safeguard the long-term peaceful use of space for current and future generations.

V. CONCLUSION

While outer space becomes increasingly central to national prosperity, economic systems, and military defenses, it has simultaneously become increasingly likely to serve as a new military battleground. As such, the phenomenon of fragmentation in international law arises from the diversification and expansion of its various fields, leading to potential conflicts and difficulties in application.²⁸⁸ This poses questions concerning the regulation of existing legal paradigms, but also questions concerning how they will react to such developments in the event an armed conflict ensues. The purpose of this Article was to discuss and address the gray (at face value) areas that occur when applying IHL and space law. While these complexities contribute to legal uncertainty in the military use of outer space, they are not insurmountable. As such, this Article emphasizes the need for a cohesive framework of principles to effectively navigate these challenges and provide clear and reasonable conclusions in specific cases.

Legal rules rarely operate in isolation. They are typically interconnected with other rules, necessitating an approach that seeks to understand and address these relationships. As outlined in Article 31(3)(c) of the VCLT, this approach mandates that treaty interpretation take into account “any relevant rules of international law applicable in the relations between the parties.”²⁸⁹ This positions treaty interpretation within the broader framework of international law, including CIL and general principles of law. When applying IHL to outer space activities governed

288. See ILC Study Group, *supra* note 192, at 11 (“One of the features of late international modernity has been what sociologists have called “functional differentiation,” the increasing specialization of parts of society and the related autonomization of those parts. This takes place nationally as well as internationally. It is a well-known paradox of globalization that, while it has led to increasing uniformization in the life of societies around the world, it has also led to the increasing fragmentation thereof—that is, to the emergence of specialized and relatively autonomous spheres of social action and structure.”).

289. See Vienna Convention, *supra* note 116, at art. 31(3)(c).

by space treaties, a systemic integration approach becomes essential. While the principle of *lex specialis* is often invoked in cases of conflicting norms, caution is warranted against oversimplifying its application, particularly when fundamental values or the systemic objectives of international law are at stake.²⁹⁰ Instead, a process of harmonization grounds principles of legal integrity and coherence into the interpretation process. Hence, a key methodology for managing fragmentation and promoting coherence is systemic integration.

By considering the broader legal context, systemic integration facilitates harmonization through ensuring that the interpretation of specific rules aligns with the overarching objectives and functions of the international legal system. This approach recognizes the interconnectedness of international law and aims to create a purposive legal framework rather than a mere collection of isolated rules.²⁹¹ The OST sets out principles for the peaceful exploration and use of outer space for the benefit of all humanity.²⁹² When IHL principles, such as proportionality, are applied in this context, Article 31(3)(c) of the VCLT mandates consideration of the OST's provisions.²⁹³ As exemplified in this Article, a likely prominent key area of consideration is the potential for kinetic weapons to generate long-lasting space debris, which raises significant concerns about impeding the peaceful use of outer space, a fundamental principle enshrined in the OST.²⁹⁴ Accordingly, a systemic interpretation of IHL's proportionality principle in the outer space context must incorporate both the environmental dimension and the long-term consequences for all states, as guided by the OST.

In conclusion, as outer space emerges as an increasingly critical and potentially contested domain, the intersection of IHL and space law presents complex challenges that stretch traditional legal frameworks. Although uncertainties remain regarding the applicability of IHL to space-based conflict and the legal classification of dual-use objects, these ambiguities are not insurmountable. The limitations of a narrow reliance on doctrines such as *lex specialis* highlight the need for a more sophisticated approach, one rooted in the principle of systemic integration. International law should be understood as a coherent legal

290. See Martii Koskenniemi and Päivi Leino, *Fragmentation of International Law? Postmodern Anxieties*, 15 LEIDEN J. INT'L L. 553, 554 (2002).

291. See GABRIEL ORELLANA ZABALZA, *THE PRINCIPLE OF SYSTEMIC INTEGRATION: TOWARDS A COHERENT LEGAL ORDER* 1, 8-9 (Zurich: Lit., 2012).

292. See OST, *supra* note 8, at arts. I, II, III, and IX.

293. See Vienna Convention, *supra* note 116, at art. 31(3)(c).

294. See Pobjie, *supra* note 119, at 10-11.

system, in which individual norms are interpreted in light of other applicable rules and overarching principles, rather than treated as isolated or conflicting mandates. Through the interpretive lens of systemic integration, the principles of IHL must be read in harmony with the foundational values of space law. This approach fosters a more coherent and responsible legal framework for regulating military activity in orbit. Looking ahead, advancing legal harmonization through systemic integration, supported by greater transparency and confidence-building measures, is essential. Such efforts are vital not only to protect human security, but also to ensure the long-term sustainability of outer space for the benefit of current and future generations.