

Outer Space Militarization and the Emerging Paradigm of Weaponization: Implications for Space Security and International Regulation

Militarização do Espaço Exterior e o Paradigma Emergente de Armamento: Implicações para a Segurança Espacial e Regulamentação Internacional

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Abstract

The 21st century is not remarkable witness scientific discoveries and invention but also exploration of area beyond the earth. The outer space is the exponential emerging field for the astronomical research and exploration. But it also achieved significant growth from militarization to weaponization the outer space. The outer space is the province of all humanity and global common beyond the exclusive jurisdiction of any State, which shall be used for the peaceful purposes. The various space power has possessed the anti-satellite weapons and further investing on more advance technology to maintain their dominance over the utilization of the outer space. Consequently, although the international framework governing outer space emphasizes its "peaceful use," there is uncertainty in how this phrase is understood, with many interpretations often limiting it to non-military or non-aggressive purposes. In the light of these chronic deficiencies there is a pressing need to address the gaps in the international space regulations to forestall any further weaponization of space.

Keywords: Militarization; Outer Space Treaty; Peaceful Purposes; Space Security, Weaponization.

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Resumo

O século 21 não é um testemunho notável de descobertas e invenções científicas, mas também de exploração de áreas além da Terra. O espaço sideral é o campo emergente exponencial para a pesquisa e exploração astronômica. Mas também alcançou um crescimento significativo, desde a militarização até ao armamento do espaço exterior. O espaço exterior é domínio de toda a humanidade e comum global, além da jurisdição exclusiva de qualquer Estado, que será utilizado para fins pacíficos. As várias potências espaciais possuem armas anti-satélite (ASAT) e investem ainda mais em tecnologia mais avançada para manter o seu domínio sobre a utilização do espaço exterior. Consequentemente, embora o quadro internacional que rege o espaço exterior enfatize a sua “utilização pacífica”, há incerteza na forma como esta frase é entendida, com muitas interpretações limitando-a frequentemente a fins não militares ou não agressivos. À luz destas deficiências crônicas, há uma necessidade premente de colmatar as lacunas nas regulamentações espaciais internacionais para evitar qualquer maior armamento do espaço.

Palavras-chave: Militarização; Tratado do Espaço Exterior; Propósitos Pacíficos; Segurança Espacial, Armamento.

Introduction

The outer space is the province of all mankind, and it is to be used for the peaceful purpose for the welfare of the humanity. It has been using for the militarization and intensification of the militarization is shifted toward the weaponization of the outer space which is posing or cause to pose threat to international peace and security. The rising competition among the space powers, emerging new investors and commercialization of the outer space further exacerbate and escalates the unprecedented challenges of the regulation of the outer space regime. The growing cynicism among the powerful States has led to integrate the space-based assets into ground air and sea warfare. This assimilation has done for the both offensive and defensive purposes. The space security has become a concern for the world community due to the use of space for both militarization and weaponization. In 2007 China conducted successful anti-satellite missile test, it destroyed the Chinese weather satellite-the FY-1C (COSPAR 1999-025A) polar

orbit satellite of the Fengyun series³ and U.S reaction to it turned world community eyes to this sensitive issue. the space issues are not only limited to the space security but it encompassing to the largest spectrum including rules of warfare, health, environment and human rights as well.

The USSR has launched the Sputnik-1 in Cold War⁴ has opened the door for the space exploration in this regard the U.S.A. has achieved remarkable success by landing Apollo-11 on moon⁵. Whilst space exploration is still done for scientific reasons, there is an increasing concentration on the use of space technology in warfare and the expanding possibility of deploying weapons in space. For instance, during Operations Desert Shield and Desert Storm in the Gulf War 1991, the United States relied heavily on satellites for communication, navigation and information.⁶ Now since it is crystal clear that outer space may be used for military purposes.

In order to regulate the space regime, the international community has adopted various rules and treaties, the Outer Space Treaty 1967 (OST) is regarded the Magna Carta of the international space regime. Similarly, the Limited Test Ban (LTBT) 1963 and Anti-Ballistic Missile Treaty (ABM) 1972 have been adopted for the regulation of the outer space activities but these instruments have failed to regulate the outer space activities. The failure of these treaties was primarily due to their faulty approach which addressed only the cold war regime rather than postwar development in scientific and technological exploration of outer space. As a result, there is a pressing need for robust regulation of outer space to guarantee its peaceful utilization. This urgency arises from the fact that large number of States, such as

³NICHOLSON, Brendan. World Fury at Satellite Destruction. **The Age**. Available in: <https://www.theage.com.au/national/world-fury-at-satellite-destruction-20070120-ge416d.html>. Accessed March 5, 2023. Also DAVID, Leonard. China's Anti-Satellite Test: Worrisome Debris Cloud Circles Earth. **Space.com**, November 17, 2021. Available in: <https://www.space.com/3415-china-anti-satellite-test-worrisome-debris-cloud-circles-earth.html>. Accessed March 5, 2023.

⁴U.S Department of State Archive. **The launch of sputnik - 1959**. 20 January 2009. Available in: <https://2001-2009.state.gov/r/pa/ho/time/lw/103729.htm>. Accessed March 5, 2023.

⁵NASA. **Apollo 11 Mission Overview**. https://www.nasa.gov/mission_pages/apollo/missions/apollo11.html. Accessed March 6, 2023.

⁶MAOGOTO, Jackson; FREELAND, Steven. Space Weaponization and the United Nations. Charter: A Thick Legal Fog or a Receding Mist. **The International Lawyer**. v. 41, n. 4, p. 1091–1119, 2007.

China and Russia, have concluded that the existing laws are ineffective because the Outer Space Treaty (OST) lacks a clear prohibition against placing all forms of weaponry in space⁷. Furthermore, the legal framework governing outer space is deficient and subject to varying interpretations.

In this article, the initial emphasis is placed on providing a concise overview of the historical context surrounding issues related to outer space. Secondly, discussed the Westphalia sovereignty and outer space. Thirdly, analysis the peaceful use of the outer space. Fourthly, discussed the most difficult issues of militarization and weaponization of outer space along with their differences. Fifth, examined the legal framework to regulate activities in outer space and difficulties in regulation of it. Finally, concluding remarks with suggestions for proper regulation of outer space regime.

1 Background of the problem

The technology and warfare are eternal in their nature, warfare is the conduct of the war and technology shapes warfare not war. Warfare aims to influence human actions through the use or threat of physical force, while technology aims to manipulate the physical environment to achieve human objectives. From the Stone Age to the Nuclear Age, technology has changed combat more than any other variable, driving the evolution of warfare. In 19th century military ballooning emerged as most advance technology for accurate reconnaissance and observation. It was utilized to detect enemy movements, direct artillery fire, and warn of impending enemy attacks. It also used to convey products, communications, and people across battlegrounds.⁸ In the 20th century, aircraft played most significant role in the warfare it changes the entire fabric of the warfare by granting armies dominance of strategically important airspace. High-altitude aircraft were utilized for espionage

⁷ The concerns were raised during conference titled 59th session of the UN Committee on the peaceful uses of outer space, Vienna, Austria, 26 June 2016.

⁸ NATIONAL AIR AND SPACE MUSEUM. Balloons and Dirigibles in WWI. **National Air Space Museum**, Available in: <https://airandspace.si.edu/multimedia-gallery/wwi-german-observation-balloong54447jpg#:~:text=During%20World%20War%20I%2C%20all,enemy%20balloons%20a%20target%20priority>. Accessed April 1, 2023.

missions, allowing them to spy on enemies while remaining safe from their fire. The U.S. U-2 high-altitude jet aircraft, renowned for its intelligence-gathering, surveillance, and reconnaissance capabilities, is famously referred to as the "Dragon Lady" spy plane.⁹Initially, the CIA and USAF utilized it to observe electronic signals, collect data from the upper atmosphere to detect nuclear weapon tests, and capture images of locations deep within the territories of the former USSR and other adversaries during the Cold War.¹⁰

Nevertheless, the U-2 incident in May 1960, when it was shot down over the former USSR, led to increased efforts to develop safer surveillance methods that could extend deeper into space.¹¹The V2 rocket, also known as the "Vergeltungswaffe," was the first major liquid-propellant rocket globally and was developed by Nazi Germany between 1936 and 1942. These activates are regarded as a significant achievement in the field of rocketry, as the adoption of liquid fuel effectively doubled its thrust capabilities, resulting in it becoming the first man-made object to reach outer space. This breakthrough opened up the potential for further exploration of outer space.¹²

Nowadays, the outer space has recognized as highly militarize ground for most of the investors likes U.S.A. Russia, China, France, India, Japan and Israel are investing to develop hit-to-kill system to be used for anti-satellite (ASAT) or missile defense. Although, space power dominating counties already have developed the ASAT technology. ASAT (Anti-Satellite) systems have the ability to manipulate, disrupt, restrict, deteriorate, or even eliminate objects in space.¹³The growing

⁹ The editors of encyclopedia Britannica. Ben R. Rich: American engineer. **Encyclopedia Britannica**, 14 Jun. 2023. Available in: <https://www.britannica.com/biography/Ben-R-Rich>. Accessed September 6, 2023.

¹⁰ The editors of encyclopedia Britannica. Ben R. Rich: American engineer. **Encyclopedia Britannica**, 14 Jun. 2023. Accessed 6 September 2023.

¹¹ It is any area of space that is outside of the bounds that are established in relation to a celestial body or system, though it is most commonly: a. The area of space immediately outside of the Earth's atmosphere. b. Space between planets or stars.

¹² HARVEY, Ailsa. V2 Rocket: Origin, History and Spaceflight Legacy. **Space.com**. Available in: <https://www.space.com/author/ailsa-harvey>. Accessed 6 March. 2023.

¹³ Secure World Foundation Releases New Infographic on Anti-Satellite Weapons and Space Sustainability. **Secure World Foundation**. Available in: <https://swfound.org/news/all->

importance of space capabilities in contemporary military forces, especially in major nuclear-armed States, motivates the development and potential deployment of such weaponry. Interfering with an adversary's space capabilities is a consideration in military strategy, but it carries the risk of nuclear escalation and enduring threats that persist even after a conflict concludes.

Presently, destructive ASAT tests have been carried out by four States: The U.S.A Russia, China, and India.¹⁴

Moreover, the commitment of States to safeguard their space assets is evident in their space policies. For instance, the U.S.A

is moving towards the creation of the Space Force as a new branch of its military, acknowledging space as a domain of warfare.

This response is driven by concerns over the development of kinetic and electronic weapons¹⁵ by China and Russia. The large number of States with active space programs acknowledge the importance of protecting their space assets. In 2023, France intends to launch small protective spacecraft equipped with cameras and potentially defensive armaments. Additionally, they plan to introduce a new generation of Syracuse satellites by 2030, designed to identify and neutralize adversary space satellites.¹⁶

Furthermore, the advancement of Anti-Satellite (ASAT) technology, the proliferation of space weaponization initiatives, and the inability to prevent nations from leaving debris in outer space all exemplify the shortcomings in regulating

news/2022/06/swf-releases-new-infographic-on-anti-satellite-weapons-and-space-sustainability/#:~:text=Recently%2C%20the%20United%20States%20became,weapons%2C%20to%20do%20the%20same. Accessed March 6, 2023.

¹⁴ Secure World Foundation Releases New Infographic on Anti-Satellite Weapons and Space Sustainability. **Secure World Foundation**. And, GEORGE, PaulJustin. History of anti-satellite weapons: US tested 1st ASAT missile 60 years ago. **The week Magazine**. March 27, 2019. Available in: <https://www.theweek.in/authors.justin-paul-george.html>. Accessed March 6, 2023.

¹⁵ GONZALEZ, Jennifer. U.S. Space Force: The Sixth Branch of the U.S. Armed Forces. **Library of Congress Block**. Available in: <https://blogs.loc.gov/law/author/jgo>. Accessed 6 March. 2023.

¹⁶ France to launch 'fearsome' surveillance satellites to bolster space defenses. Reuters. July 25, 2019. Available in: <https://www.reuters.com/article/us-france-space-defence-idUSKCN1UK1TY>. Accessed March 6, 2023.

activities in the outer space. The Outer Space Treaty 1967 (OST) failed to prevent sophisticated weapon likes, ASAT.

However, the ASAT can either be conventional or nuclear but the purpose is clear that either destroy or neutralize a satellite currently in orbit around the earth. Article 1 of the Outer Space Treaty (OST) is aimed at permitting all states and people to engage in peaceful space exploration.¹⁷ Consequently, the inability to prevent the development of Anti-Satellite (ASAT) technology carries significant and potentially grave repercussions for the global population. The outer space regulatory framework has fallen short in effectively addressing the problem of space weaponization.

The article IV of the OST does forbid the

“States Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.”¹⁸

However, it does not specifically prohibit other weapons types from being deployed to manmade platforms in space. This oversight and failure of the OST has left door open to interpretation and is being exploited by space powers in their development of the policy and planes to dominate the space medium. Further, the international space regime also failed to regulate and control of the debris by nations that adds to the amount of debris in outer orbit around the earth.

An estimated total of over 5,000 satellites have been placed in orbit around the Earth. Of these, approximately 950 are currently operational, while around 2,300 are categorized as "inactive" satellites incapable of being maneuvered or repositioned.¹⁹ Considering these circumstances, it becomes evident that there is a necessity for comprehensive regulation of space activities to uphold international

¹⁷ See, the Article 1 of the United Nations Treaties and Principles on Outer Space, related General Assembly resolutions and other documents, New York: UN2002.

¹⁸ See, the Article 4 of the United Nations Treaties and Principles on Outer Space, related General Assembly resolutions and other documents, New York: UN2002.

¹⁹ GREGO, Laura. A History of Anti-Satellite Programs. **Union of Concerned Scientists**. March 1, 2012. Available in: <https://www.ucsusa.org/resources/history-anti-satellite-programs>. Accessed May 2, 2023.

peace and ensure that space is employed for peaceful purposes to benefit all of humanity.

2 Outer space and state sovereignty

On September 20, 1963, John F. Kennedy, the president of the U.S.A. stated to the 18th UN General Assembly

“space offers no problems of sovereignty; by resolution of this Assembly, the members of the United Nations have foresworn any claim to territorial rights in outer space or on celestial bodies and declared that international law and the United Nations Charter will apply”²⁰

The term space is indefinite and has never been formalized in international legal framework. It defines as the region of the universe between celestial bodies, more specifically the region outside the earth's atmosphere. Since an exact definition of airspace with defined boundaries had never been established by air law, there was no clear solution.²¹ It also rise the fundamental question whether Westphalia notion of the State sovereignty is applicable to the outer space. In this regards U.S air law expert argued that State sovereignty did not coverage to outer space.²² This viewpoint triumphed out, and the legal status of space based on it is still acknowledged in the case of reconnaissance satellites. The U.S.A. was the first to advocate for the legality of observing on other countries from space. The suggestion by President Eisenhower for an Open Skies Policy to permit the U.S.A. and the Soviet Union to monitor each other's territories to prevent a surprise assault was the first official move towards legitimizing remote sensing for reconnaissance.²³ Moreover, Outer space, by virtue of international law, is not subject to the

²⁰ See, John F. Kennedy “Space offers no problems of sovereignty; by resolution of this Assembly, the members of the United Nations have foresworn any claim to territorial rights in outer space or on celestial bodies, and declared that international law and the United Nations Charter will apply”. Available in: <https://libquotes.com/john-f-kennedy/quote/lbo5p1q>. Accessed July 12, 2023.

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²²COOPER, J.C. High Altitude Flight and National Sovereignty. **International Law Quarterly**, Cambridge University Press, Jul. 1951, v. 4, n. 3, p. 411–418.

²³SPECTOR, Leonard, S. **The Not- so Open Skies, Commercial Observation Satellites and International Security**. Hampshire, Macmillan Press, 1990, p. 165. See also D.R. Terrill, *The Air Force Role in Developing International Outer Space Law*. Alabama, Air University Press, 1999, 9.

sovereignty of any state, in contrast to airspace, which is subject to the territorial sovereignty of the underlying State.²⁴

The outer space is also considered the Common Heritage of Mankind (CHM). This principle, as endorsed by the United Nations General Assembly through various declarations and treaties, asserts that the natural resources found in both the deep seabed and outer space are collectively owned by all nations and should be distributed fairly for the collective benefit of humanity. Specifically, the CHM principle outlined in the Treaty Governing the Activities of States on the Moon and Other Celestial Bodies (commonly known as The Moon Treaty) of 1979 aligns with the fair distribution of resources in outer space, the prohibition of resource appropriation where they are found (especially in the context of space mining), and the creation of a worldwide framework for overseeing commercial endeavors in space.²⁵

The CHM principle was established with the understanding that it is crucial to strategize for the future exploration and utilization of these important areas. This planning aims to secure not only a fair allocation of their natural resources but also to prevent conflicts among nations, as has occurred during past eras of exploration. The proponents of the CHP argue that this concept confers a special status upon a territory, defining it as a shared heritage known as "*Res Communis humanitatis*."²⁶ This means it is a collective legacy that no single Nation can claim ownership of, but from which all nations can derive advantages and benefits. This concept is rooted in the idea that certain regions are universally shared and should be treated as such. The initial principle is that no nation can assert ownership or control over the territory

²⁴UNITED NATIONS. **Convention on International Civil Aviation**. v. 15, p. 295. Chicago, 1944.

²⁵UNITED NATIONS. Agreement governing the Activities of States on the Moon and Other Celestial Bodies, United Nations. **Treaty Series**, v. 1363, p. 3. And, UNITED NATIONS. Depositary notification **C.N.107.1981. TREATIES-2 of 27 May 1981**. The Agreement was adopted by resolution 34/68¹ of the General Assembly of the United Nations dated 5 December 1979. It was opened for signature on 18 December 1979.

²⁶LAVER, Michael. Public, Private and Common in Outer Space: Res Extra commercium or Res Communis Humanitatis Beyond the High Frontier? **Political Studies**, v. 34, n. 3, p. 359-373, 1986. Available in: <https://onlinelibrary.wiley.com/toc/14679248/1986/34/3>. Accessed July 12, 2023

or its resources.²⁷The CHM additionally asserts that these shared areas should exclusively serve peaceful objectives and be overseen and administered by an international entity. ²⁸ Finally, CHM conceptualizes the equitable distribution of the benefits derived from the use of shared resources because they are located in a common area.²⁹ There are also other criteria that differ amongst CHM definitions. These include environmental protection and a ban on exploitation or colonization prevention. Surprisingly, the Moon Agreement did not clarify the specific meaning of CHM. For instance, Article 11 of the treaty, which calls for the creation of an international framework to manage the utilization of lunar resources, lacks a clear definition of the exact scope of the CHM. Therefore, the importance of CHM can be understood by examining its application in other contexts, like the High Seas, where the United Nations Convention on the Law of the Sea (UNCLOS) and the Antarctic Treaty explicitly define and apply this principle. The High Seas and Antarctica are examples of global commons, often referred to as "*Res Communis*," and are highly relevant to the concept of the CHM. ³⁰ It is essential to grasp the meaning of CHM by examining the Moon Agreement's negotiation history, especially in view of the numerous drafts proposed by different nations. This is crucial for comprehending the way in which States have formulated the application of the CHM to celestial bodies like the Moon and how they intend to do so moving forward. Moreover, the reluctance of wealthier nations to embrace CHM, as opposed to less developed countries, holds significance in understanding the implications attached to this principle.

²⁷MOLITOR, Steven J. The Provisional Understanding Regarding Deep Seabed Matters: An Ill-Conceived Regime for U.S. Deep Seabed Mining. **Cornell International Law Journal**, v. 20, n. 1, p. 223, 228, 1987. Available in: <https://scholarship.law.cornell.edu/cilj/vol20/iss1/7/>. Accessed July 12, 2023.

²⁸GANGALE, Thomas. Myths of the Moon Agreement. Aerospace research central, **American Institute of Aeronautics and Astronautics. AIAA 2008-7715**. Space 2008. San Diego, California. Available in: <https://arc.aiaa.org/doi/book/10.2514/MSPACE08>. Accessed June 13, 2023.

²⁹HARRY, Martin. The Deep Seabed: The Common Heritage of Mankind or Arena for Unilateral Exploitation? **Naval Law Review**, v. 40, n. 207, 1992.

³⁰SHACKELFORD, Scott J. The Tragedy of the Common Heritage of Mankind. **Stanford Environmental Law Journal**, v. 27, 2008. Available in http://www.dphu.org/uploads/attachements/books/books_3796_0.pdf. Accessed 14 July. 2023.

3 Peaceful use of outer space

Space technology holds immense importance and is highly valuable, primarily because outer space is consistently utilized for civilian purposes. The contemporary economic development, communication systems, aviation industry, and various military operations heavily depend on the utilization of outer space. Space based technology revolutionized human life. However, the main challenges are now that majority of the equipment used for military space operation which serves as some dual purposes not just in the sense that they are offensive and defensive, but also because they conduct both military and civilian/commercial operations. Although, there are similarity in military and civilian uses of space technology are equally important. Technically speaking, there is also no distinction between military missiles and commercial space launch vehicles, which contributes to the challenges brought on by the dual-use satellite phenomenon. The technologies needed for civilian usage are frequently comparable to or even identical to those used to create advanced weapons.³¹ The term "Dual Use Satellite" is now widely used in the space industry, which raises more complex legal questions. It is also important to remember that the word "peaceful" carries with it a necessary predefined value judgement. The concept of "Peaceful Purpose" lies at the heart of the current international political challenge. There has been considerable scholarly discussion about the scope and importance of utilizing outer space for peaceful purposes.³² Article 2(4) of the United Nations Charter (UNC) forbids any act of threatening or employing force that could undermine the territorial integrity or political independence of any nation, or any action that is contrary to the goals of the United

³¹HUREWITZ, Barry J. Non-Proliferation and Free Access to Outer Space: The Dual-Use Dilemma of the Outer Space Treaty and the Missile Technology Control Regime. **High Technology Law Journal**. v. 9, p. 211, 217. 1994.

³² See, the explaining the U.S.A, position on military uses of space before the First Committee at the seventeenth session of the United Nations General Assembly on December 3, 1962, Senator Albert Gore stated : "The test of any activity must not be whether it is military or non-military, but whether or not it is consistent with the UN Charter and other obligations of international law... observation from space is consistent with international law, just as observation from the High Seas"

Nations.³³ The Article IV of the OST does not explicitly forbid the peaceful use of outer space,³⁴ although the precise boundaries of this prohibition continue to be a subject of intense debate in the present day. Broadly speaking, it is commonly understood that this provision prohibits the use of force, with the only permissible exceptions being self-defense limited to what Article 2(4) of the UNC allows and authorization from the UN Security Council in accordance with Chapter VII of the UNC.³⁵

While the Outer Space Treaty upholds the right to self-defense, it places limitations on the methods of defense that can be employed. Nevertheless, several military actions could still be categorized as self-defense. The Space Treaty's reference to the UNC, especially Article 51, and its explicit recognition of states' rights to employ space for self-defense, hold significant implications in terms of the use of force. The article may give the best indication that the space regime will be subject to international law of war. Additionally, Article IV establishes two distinct legal frameworks for military operations in space: one for operations on the moon and other celestial bodies, and the other for operations in actual space. The Earth's orbit, celestial bodies, and outer space are the three categories that Article IV uses to categorize the alien cosmos. This suggests that not all military use of space is totally prohibited by the OST.³⁶ Space law commentators generally agree, though not unanimously, that this is geared at non-military rather than merely non-aggressive activity. However, in practice, this has not always been the case. It is indisputable that, in addition to the numerous commercial scientific uses, space has

³³ The Charter was signed at San Francisco on 26 June 1945. The amendments included here are: Amendments to Articles 23, 27 and 61, 557 UNTS 143, adopted by the General Assembly Resolutions 1991A and B (XVIII) of 17 December 1963, entered into force on 31 August 1965 for all Members; - Amendment to Article 109, 638 UNTS 308, adopted by the General Assembly Resolution 2101 (XX) of 20 December 1965, entered into force on 12 June 1968 for all Members; Amendment to Article 61, 892 UNTS 119, adopted by the General Assembly Resolution 2847 (XXVI) of 20 December 1971, entered into force on 24 September 1973 for all Members.

³⁴ See, the article 4 of the United Nations Treaties and Principles on Outer Space, related General Assembly resolutions and other documents, New York: UN2002)

³⁵ RAMEY, Robert A. **Armed Conflict on the Final Frontier: The Law of War in Space.** *The Air Force Law Review*, v. 48, A.F. L. Rev. 1, 60, 62, 2002.

³⁶ CHENG, Bin. **The Legal Status of Outer Space and Relevant Issues:** Delimitation of Outer Space and Definition of Peaceful Uses, 11 J. Space L. 89, 1983, 101.

been and is still being exploited for a wide range of military-related tasks. A multilateral convention, according to most UN member states, is the only way to stop an arms race from starting as a result of the militarization of space. The OST places a strong emphasis on the idea that space research should be useful to all of humanity and all states, and it should be done peacefully. It contends that one country cannot assert national sovereignty in space. The OST stated that space should be used for “peaceful purposes.” It declared that any nation was free to explore outer space, and no nation could claim parts of outer space as their own. This was meant to prevent colonization of space like the colonization carried out by countries in the last millennium.

Also, the treaty prohibited nations from putting any weapons, including weapons of mass destruction and/or nuclear weapons, in outer space. This resolution became the foundation for all international law concerning space that came after it. However, one stumbling point of the treaty was that it did not ban the exploration of military capabilities in space, which left loopholes for countries to begin weaponization of space programs. Articles IV and IX of the OST are the most pertinent clauses with relation to space weaponization. According to Major Douglas Anderson, “Most analysts consider paragraph IV to be simply a modest disarmament provision. The fact that the treaty permits the stationing of land-based Continental Ballistic Missiles (ICBMs), despite their flight trajectory passing through space, is evidence that the treaty's authors solely intended Article IV (1) to outlaw orbiting nuclear-type weapons.³⁷ It is commonly known that Article IV (1) is the only restriction that specifically prohibits using the outer empty area for military purposes. According to Bin Cheng, “as long as no ‘nuclear weapons or any other sort of weapons of mass destruction’ stationed there, the outer vacuum space as such can be utilized for any military that is compatible with general international law and the United Nations Charter.”³⁸

³⁷GALLAGHER, Michael G. Legal Aspects of the Strategic Defense Initiative. **Military Law Review**, v. 111, 1986.

³⁸CHENG, Bin. **Studies in International Space Law**. New York: Oxford University Press Inc., 1997.

In 2000, the General Assembly passed the *Prevention of Outer Space Arms Race* resolution. This document restated what was mentioned in the OST and called on nations to stop developing weaponization of space programs. In 2004, the General Assembly came out with a statement saying that the UN Committee on Peaceful Uses of Outer Space was not doing its job, and the Committee had not condemned and/or punished nations who had started weaponization of space programs. Also, the General Assembly said that it was afraid that weaponization of space programs was a threat to international security and peaceful cooperation. These evidence of the military utilization of the space technology bring to the forefront concerns regarding to international law and existing legal framework overseeing military utilization of space.

The utilization of space technology in this context gives rise to broader inquiries about the "militarization" of outer space and the deployment of such weaponry in situations involving armed attacks or self-defense, as acknowledged within the framework of the UNC and the international legal instruments regulating the use of force. Certainly, the UN Conventions and resolutions constitute a fundamental component of international space law. The increasing militarization of space, along with complex legal concerns, presents an immediate and significant threat to worldwide peace and security. Recent developments in Beijing and Washington have exacerbated fears of a potential space arms race. In this scenario,³⁹ it is conceivable that even without immediate harm to civilians, the intentional destruction of, for example, a communication or weather satellite using a missile akin to those launched by China or those that might be deployed as part of the U.S. missile defense system could result in severe consequences for a community, a nation, or even an entire region of the world.

There is a chance that millions of lives and livelihoods will be impacted, economies will collapse, and vital services won't function. Space is used for both

³⁹ On January 11, 2007, the Chinese military launched a KT-1 rocket that successfully destroyed a redundant Chinese Feng Yun 1-C weather satellite, which it had launched 1999, in Low Earth Orbit approximately 800 kilometers above the earth. And, just ten days after the Chinese satellite test, the U.S. military also experimented its ballistic missiles from Prague military base.

peaceful human benefits and violent conflicts and coordinated killings. These two uses coexist. The paradox of the modern world is that deterrence and weaponization are what bring about peace, and even God's exclusive domain of outer space has not been spared. So far, the use of outer space has been confined to peaceful activities, including satellite communications systems and scientific research. These activities are considered to be for the benefit of all humanity. The reasoning behind this argument comes from the idea that an individual country will be less likely to wage war on another country with whom it has a relationship in present times, this means nearly every country. As a result, there is less of a need for countries to have large weapons arsenals and countries are more likely to accept disarmament programs. Thus, the use of outer space has promoted developing an international security regime that benefits every nation, and the weaponization of space would go against the global trend towards a common security.

Positive economic and scientific endeavors are inherently at odds with the militarization and weaponization of space. The innate trust and cooperation required to maintain the systems deployed in space for peaceful reasons would be destroyed by a space conflict. The space-based air defense system must, like any other air defense system, include sensors to identify and track enemy missiles from the moment they are launched, kill weapons to shoot them down, and any necessary command and control components. The creation of space-based sensors on satellites for monitoring, the detection and tracking of hostile missiles, as well as laser weapons and interceptors for their destruction, was conducted. The use of space to support military operations on land, at sea, or in the air is referred to as "militarizing" space. The space-based system must have sensors to find and follow an enemy missile from the moment it is launched, as well as kill weapons to shoot it down and any necessary command and control components. Another facet of the weaponization and militarization of space involves the establishment of space-based assets along with corresponding ground infrastructure for military applications. These assets encompass functions like early warning, communication, command and control, monitoring through remote sensing, and the utilization of National

Technical Means (NTM) for verification, surveillance, and intelligence purposes. It aids in enhancing weapon targeting, strategic and battlefield observation, command and control, and communications. Thus, militarism is a subset of weaponization, and there is little distinction between the two.

In a diplomatic effort to advocate for the prohibition of U.S. reconnaissance satellites, the Soviet Union initially interpreted "peaceful purposes" as equivalent to "nonmilitary," and consequently, they asserted that all military operations in space were forbidden. Conversely, former U.S. President Donald Trump publicly declared that the U.S.A. does not regard space as a global common.⁴⁰

4 The militarized outer space

The cold war between U.S.A and former USSR gave birth to the intense space race following the metallization of the outer space.⁴¹ In order to prove their dominance in space both States worked to developed cutting-edge technologies. Lyndon Baines Johnson⁴², Lyndon Baines Johnson, who served as the U.S. Senate Majority Leader and led the Democratic opposition to President Dwight Eisenhower, underscored the importance of space policy by stating in 1958 that "control of space equals control of the world." This statement played a pivotal role in sparking the space race.⁴³

The ambition of wealthy States is dominating in space race is plainly expressed in this remark. The Strategic Defense Initiative (SDI), commonly known as Wars'.⁴⁴ It was a space-based defense system, proposed on March 23, 1983, by former American President Ronald W. Reagan. Although the OST established the

⁴⁰FENHOLZ, Tim. Space is not a "Global Commons", top Trump Space Official Says. **Quartz**. December 19, 2017.

⁴¹MOWTHORPE, Matthew. **The Militarization and Weaponization of Space**. Maryland: Lexington Books, 2003.

⁴²The 36th President of the United States of America (1963–1969).

⁴³ASSER, Alan. **LBj's Space Race**: what we didn't know then. **The Space Review**, June 20, 2005. Available in: <http://www.thespacereview.com/article/396/1>. Accessed July 12, 2023.

⁴⁴ See, The Star Wars film series is the foundation of an American epic space opera property, which has also produced books, television shows, computer and video games, and comic books. The Star Wars film series depicts a universe in which good battles evil in a galaxy.

norm of peaceful usage of space, this plan was first unsettled by Reagan's proposal. The project included a directive to build a space-based anti-missile system. The goal of SDI was to create an advanced antiballistic missile defense system to thwart missile assaults or potential nuclear threats from other nations, particularly the former USSR. To effectively intercept intercontinental ballistic missiles⁴⁵, Ronald Reagan's ambitious program called for the deployment of highly advanced technologies such as supercomputer-controlled "space and ground-based nuclear X-ray lasers, subatomic particle beams, and computer-guided projectiles launched via electromagnetic rail guns. While the program didn't achieve its intended goals, the United States interpreted "military use of space" as synonymous with the "peaceful use of outer space" because not all military applications are necessarily aggressive.⁴⁶ However, this gave rise to concerns and marked the beginning of an era characterized by the militarization of space. The utilization of space for military objectives is both widespread and firmly established.

The U.S.A. military is well acquainted with the space technology for various military operations Operation Desert Storm (in Iraq, 1991), Operation Allied Forces (in Kosovo, 1999), Operation Enduring Freedom (in Afghanistan, 2002), and Operation Iraqi Freedom (in 2003).⁴⁷ Moreover, the utilization of satellites, including military, espionage, surveillance, early warning, and Military Global Positioning Satellites, in military operations is widespread and constitutes a crucial component of land-based weaponry systems.⁴⁸ In 2000, the U.S. Military employed the space shuttle 'Endeavor' to generate a three-dimensional radar map of targets in Iraq.⁴⁹

⁴⁶ See for more details: BERNHARDT, George; GRESKO, Sandra M.; MERRY, Thomas R. Star Wars versus Star Laws: Does SDI Conform to Outer Space Law; The Reagan Legacy and the Strategic Defense Initiative. *Journal of Legislation*, v. 15, 1989, p. 263.

⁴⁷WEBB, David. On the Definition of a Space Weapon (When is a Space Weapon Not a Space Weapon?). **KIPDF**. Available in https://kipdf.com/on-the-definition-of-a-space-weapon-when-is-a-space-weapon-not-a-space-weapon-by_5ae205927f8b9a452f8b4633.html. Accessed July 23, 2023.

⁴⁸WEBB, David. On the Definition of a Space Weapon (When is a Space Weapon Not a Space Weapon?). **KIPDF**.

⁴⁹WEBB, David. On the Definition of a Space Weapon (When is a Space Weapon Not a Space Weapon?). **KIPDF**.

5 Concept of weaponisation of space

The notion of weaponizing space emerged in the early 1980s with the introduction of the "Strategic Defense Initiative" (SDI), which was also famously referred to as the "Star Wars" program initiated by the United States. It refers to the development, deployment, or use of space-based systems and technologies for military purposes. This concept has been a subject of concern for many nations and international organizations due to its potential to destabilize international relations, spark conflicts, and create risks for space activities, including civilian and commercial uses of space. The militarization of outer space involves the concept of deploying a substantial number of satellites into orbit, which would be tasked with identifying the launch of hostile missiles and subsequently intercepting them.

The space-based anti-missile defense system was not envisioned as a replacement for ground-based defense. Instead, it was conceived as an integral component of a multilayered defense strategy, which also incorporated sea-based interceptors deployed on ships and the ground-based Terminal High Altitude Area Defense (THAAD) system designed to engage short and medium-range missiles.

The space weapons can be taking various forms including

- **Anti-Satellite (ASAT) Weapons:** These are designed to destroy or disable satellites. ASAT tests, like the ones conducted by different countries, have generated debris that poses risks to both satellites and spacecraft.
- **Kinetic Kill Vehicles:** These are missiles or devices designed to physically collide with satellites to destroy or disable them.
- **Directed Energy Weapons:** these include lasers or other forms of energy that can be used to disrupt or damage satellites.
- **Electronic Warfare Systems:** These systems can jam or interfere with satellite communications and navigation signals.

6 Difference between militarization and weaponization of space

The militarization and weaponization of the outer space are apparently interlinked but both have distinguished features. The militarization of the outer space

is the use of space for military purposes, such as using satellites for communication, reconnaissance, or navigation in support of national defense. The employment of space-based technologies to improve military capabilities on Earth, such as monitoring and reconnaissance, is another example of space militarization. Moreover, these satellites are employed in programs for enemy surveillance to combat and subdue an enemy, demonstrating the fact that militaries all over the world exploit space for their less-than-peaceful ends even in the absence of placing any weapons in orbit. So, militarization of space has been going on for a while. On the other hand, space weaponization signify to the development and use of space weaponry. To launch offensive or defensive weapon systems, it includes using space-based platforms like satellites and space stations. The creation of weapons that can be used to disable or destroy satellites or other space-based systems, such as anti-satellite, kinetic energy, laser, and other sorts of weaponry, is referred to as space weaponization. Some experts also considered that weapons based on the ground but developed in way to attach in space for instance antisatellite weapons.⁵⁰ In conclusion, whereas space weaponization particularly refers to the creation and use of weapons in space, space militarization is a larger notion that embraces the use of space for military purposes.

7 International legal regime to regulate activities in outer space

The international legal regime to regulate the States activities in outer space is based on the five fundamental principles and treaties. The “Declaration of Legal

⁵⁰See, for instance, the US's RIM-161 Standard Missile 3 (SM-3) is a ship-based missile system that is used as part of the Aegis Ballistic Missile Defense System to intercept short-to-intermediate-range ballistic missiles. However, the SM-3 has also been used in anti-satellite operations against a satellite at the lower end of low Earth orbit

Principles”⁵¹, the “Broadcasting Principles”⁵², the “Remote Sensing Principles”⁵³, the “Nuclear Power Sources” Principles⁵⁴ and the “Benefits Declaration.”⁵⁵ The five treaties are covering wide range of space issues within the ambit of international law. “The Outer Space Treaty (OST)1967”, “the Rescue Agreement 1968”, “the Liability Convention 1972”, “the Registration Convention 1976” and the “Moon Agreement1984”

The five treaties address various matters, including the prevention of any single nation claiming ownership of outer space, arms control, the freedom to explore, responsibility for damage caused by space objects, the safety and rescue of spacecraft and astronauts, the prevention of disruptive actions in space activities and protecting the environment, the notification and recording of space activities, scientific research, the utilization of natural resources in space, and dispute resolution.⁵⁶ These treaties were developed following a series of resolutions and declarations passed by the UN General Assembly. Additionally, the United Nations General Assembly established the Committee on the Peaceful Uses of Outer Space (COPUOS) to investigate issues related to the governance of outer space.

⁵¹**Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space General Assembly resolution 1962 (XVIII) of 13 December 1963.** Available in ://efaidnbmnnnibpcajpcglclefindmkaj/https://www.unoosa.org/pdf/gares/ARES_18_1962E.pdf.

Accessed March 6, 2023.

⁵²UNITED NATIONS. **The Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting General Assembly resolution 37/92 of 10 December 1982.** Available in: file:///C:/Users/cristianer/Downloads/A_RES_37_92-EN.pdf.

Accessed March 6, 2023.

⁵³UNOOSA. **The Principles Relating to Remote Sensing of the Earth from Outer Space General of 3 December 1986.** Available in https://www.unoosa.org/pdf/gares/ARES_41_65E.pdf.

Accessed March 6, 2023.

⁵⁴UNOOSA. **The Principles Relevant to the Use of Nuclear Power Sources in Outer Space General Assembly resolution 47/68 of 14 December 1992.** Available in https://www.unoosa.org/pdf/gares/ARES_47_68E.pdf. Accessed March 6, 2023.

⁵⁵UNITED NATIONS. **The Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries General Assembly resolution 51/122 of 13 December 1996.** Available in https://www.unoosa.org/oosa/en/ourwork/spacelaw/principles/space-benefits-declaration.html#:~:text=51%2F122.,the%20Needs%20of%20Developing%20Countries. Accessed 6 March. 2023.

⁵⁶UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS. **Space Treaty and Principles.** Available in www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html. Accessed March 9, 2023.

Furthermore, the Outer Space Treaty (OST)⁵⁷ serves as the current legal framework governing the presence of weapons in space.

The Article IV of the OST which establishes the current legal framework for space-based weaponry, prohibits the placement of nuclear weapons or other Weapons of Mass Destruction (WMD) in space, along with military activities on celestial bodies. It also outlines the procedures for peaceful space exploration. However, the legal instruments governing outer space are not intricately detailed and have limited scope. The progress of technology presents fresh challenges that might require enhancing the existing legal framework. In 1958, the United Nations Office for Outer Space Affairs⁵⁸ (UNOOSA) was created to provide support and guidance to the ad hoc Committee on the Peaceful Uses of Outer Space (COPUOS).⁵⁹ It was founded by the United Nations General Assembly in 1959 to examine global collaboration in the utilization of space and deliberate on the scientific and legal dimensions of space exploration for the betterment of humanity. humankind.⁶⁰ Moreover, the Conference on Disarmament⁶¹ (CD) is entrusted the task to handle militarization of the outer space. It was established in 1978 with the object to prevent the arm race in outer space. It consists of sixty-five-member states, including the five nuclear-armed nations.⁶² This multilateral disarmament forum was established by the international community to engage in negotiations regarding arms control and

⁵⁷The "Outer Space Treaty" Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. Adopted by the General Assembly in its resolution 2222 (XXI), opened for signature on 27 January 1967, entered into force on 10 October 1967.

⁵⁸UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS. Available in <https://www.unoosa.org/oosa/en/aboutus/index.html>. Accessed March 12, 2023.

⁵⁹UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS. **Committee on the Peaceful Uses of Outer Space.** Available in <https://www.unoosa.org/oosa/en/ourwork/copuos/index.html>. Accessed March 13, 2023.

⁶⁰UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS. **Committee on the Peaceful Uses of Outer Space.**

⁶¹UNITED NATIONS OFFICE FOR DISARMAMENT AFFAIRS. Conference on Disarmament. Available in <https://www.un.org/disarmament/conference-on-disarmament/>. Accessed March 12, 2023.

⁶²UNITED NATIONS OFFICE OF DISARMAMENT AFFAIRS. **Member States and non-member States.** Available in <https://disarmament.unoda.org/conference-on-disarmament/member-states/>. Accessed March 17, 2023.

disarmament agreements, and it is headquartered at the Palais des Nations in Geneva. Although, it has been in a standstill for many years. Since 1996 DC failed to conclude any agreements or to develop the consensus on the agenda.

8 Challenges to the legal regime of the outer space

The OST gives enough latitude to the States so that they can pursue their military objectives in the guise of civilian objectives. The Article IV of the OST allows the partial militarization of the outer space. With the development of dual use satellites, the states can easily fulfill their military goals. The same satellite can be used for the civilian purpose of predicting the weather but at the same time it may also be used for strategic purpose of army movement according to the weather condition which will serve military purpose. Weaponization of the outer space is not yet permissible under the international law regime as the outer space can be used only for the peaceful purposes. But what activities of states do fall under the category of peaceful activities is still a contested topic. So, the lawyers and academicians turn to the state practice on the same, however the popular literature suggests it to be opposite of aggression. This loose meaning attributed to the peaceful purpose leaves the enough scope for its misuse under the veil of civilian purpose. The subsequent arms race towards the militarization of space would foster a climate of doubt, mistrust, errors in judgement, competition, and aggressive deployment amongst nations, which may result in conflict. Both spacecraft used for scientific research and the full range of commercial satellites would be at risk. Other worrying problems that would become more complicated are the orbital slots issue, the radio frequency issue, and the problem of space debris. The international lawyers have been unable to keep in pace with the scientists and their scientific explorations. So, it leaves the international community into state of confusion and doubt. The international legal framework has been unable to provide a consistent answer and has been plagued by the politics of space powers. The contemporary attack on the great unknown of space threatens to catch man off guard since the physical sciences have typically grown more quickly than the sciences by which man governs himself.

Man has no standards by which his existence must be guided at the very dawn of the day when he will be working and dwelling in space. Despite its benefits, the current space legal system is unable to address the unique problems that these technologies provide. Treaties like PTBT1963,⁶³ have proved fatal to ambitious projects like ORION in USA as they prove an obstacle to the scientific explorations and the experiments. If that would not have been the case it was expected that Mars Mission could have been achieved in 1967 itself at the very minimal cost. So, the law should also not act an obstacle for future projects. The international space law fails to take into considerations the other aspects of international law being the rules of warfare, environment and human rights. The space wars always have the bearing on the human and environmental issues, but the laws have been negligent on the same. The issues of space debris or the rule of proportionality in the international humanitarian law are not taken into considerations while waging the space wars. The space race is highly motivated by the national prestige and to some extent based on the competitive feelings among the states; this in turn leaves the humanitarian and human rights concerns at the bay. These are weapons that use space to attain their destinations, such as hypersonic technological vehicles⁶⁴ and the US ballistic missile defense system, which can strike targets from space and

⁶³ See, On August 5, 1963, the Limited Test Ban Treaty was signed by the United States, Great Britain, and the Soviet Union. After Senate approval, the treaty that went into effect on October 10, 1963, banned nuclear weapons testing in the atmosphere, in outer space, and under water.

⁶⁴For example, China's DF-ZF, hypersonic glide vehicle that could be used for nuclear weapons delivery. See also, **Missile Defense Advocacy Alliance. DF-ZF Hypersonic Glide Vehicle.** Available in <https://missiledefenseadvocacy.org/missile-threat-and-proliferation/todays-missile-threat/china/df-zf-hypersonic-glide-vehicle/#:~:text=The%20DF%20ZF%20brings%20hypersonic,missile%20defenses%20to%20intercept%20it>. Accessed July 23, 2023.

from ballistic missiles.⁶⁵ The nations, including the US⁶⁶ Russia⁶⁷ and China⁶⁸ have previously conducted tests with these weapons to kill space targets.

Concluding remarks

Regulating outer space is a complex task that requires international cooperation and consensus due to its global nature. While there are existing frameworks and treaties governing some aspects of space activities, there is room for improvement and adaptation to address emerging challenges. Here are some suggestions for the regulation of outer space. The develop a comprehensive international framework or treaty that covers all aspects of space activities, including space debris management, resource utilization, cybersecurity, and the peaceful use of outer space. Moreover, the OST reflecting three significant resolutions from the 1960s, support the position that ground rules in the exploration and the use of outer space must be observed, particularly in the absence of space law rules. The issue of the weaponization of space is very difficult because it has polarized the world. Therefore, the efforts of the world community can be directed at the regulations of all weaponization of space programs, establishment of monitoring systems of weaponization of space programs, the limit on the number of weapons any nation should be able to deploy into space, enforcement mechanisms for a new weaponization of space treaty and the methods for resolving any weaponization of space related disputes. Although the PPWT aims at the above objectives, but the status of the draft treat still remains in the negotiation stage. It is hoped that soon it

⁶⁵Outer space Militarization, weaponization, and the prevention of an arms race. **Research Critical Will**. Available in <https://www.reachingcriticalwill.org/resources/fact-sheets/critical-issues/5448-outerspace>. Accessed July 26 . 2023.

⁶⁶ US conducted an anti-satellite missile test using an ASM-135 ASAT to destroy the P78-1 satellite, GEORGE, Justin Paul. **History of anti-satellite weapons: US tested 1st ASAT missile 60 years ago**. March 27, 2019. Available in <https://www.theweek.in/news/sci-tech/2019/03/27/history-anti-satellite-weapon-us-asat-missile.html> Accessed August 1, 2023.

⁶⁷GEORGE, Justin Paul. History of anti-satellite weapons: US tested 1st ASAT missile 60 years ago. **"Russia also successfully conducted many tests of the PL-19 Nudol missile that can hit assets in space like satellites"**..

⁶⁸GEORGE, Justin Paul. History of anti-satellite weapons: US tested 1st ASAT missile 60 years ago. **"In January 2007, China conducted an anti-satellite missile test by destroying its weather satellite (FY-1C polar orbit satellite) at altitude of 865 km by a kinetic kill vehicle"**.

will become a binding treaty and will thus eliminate the possibility of weaponization of the outer space. However, it is necessary to define precise definitions for terms like "space weapons," "peaceful purposes," and "military uses." Although, achieving consensus on these regulations may be challenging due to differing national interests, the collective commitment to the responsible and sustainable use of outer space is paramount. The protection of outer space as a shared global resource is not only in the interest of current generations but also for the well-being of generations to come. With international cooperation and adherence to agreed-upon norms, we can ensure that outer space remains a domain of exploration, cooperation, and advancement for all of humanity.

The following recommendations aim to address the challenges outlined in the paper and promote international cooperation in regulating outer space activities for the benefit of all nations and future generations.

1. **Strengthen Existing Space Treaties:** Nations should work collaboratively to strengthen and update existing space treaties, such as the Outer Space Treaty (OST), to address contemporary challenges. This may involve amending these treaties to provide clearer definitions, regulations, and enforcement mechanisms regarding space activities, especially in the context of space militarization and weaponization.

2. **Comprehensive International Framework:** The international community should actively pursue the development of a comprehensive international framework or treaty that encompasses all aspects of space activities. This framework should include provisions for managing space debris, regulating resource utilization, ensuring cybersecurity, and promoting the peaceful use of outer space.

3. **Negotiate and Ratify Space Weaponization Treaty:** Efforts should be directed towards negotiating and ratifying a treaty that explicitly prohibits the weaponization of outer space. The international community should prioritize discussions on the Prevention of an Arms Race in Outer Space Treaty (PPWT) and seek ways to finalize and implement it.

4. **Define Precise Terminology:** To facilitate negotiations and regulatory efforts, it is essential to define precise terminology related to space activities, such as "space weapons," "peaceful purposes," and "military uses." Developing shared definitions will help nations reach common ground and foster cooperation.

5. **Strengthen Space Debris Mitigation:** Given the increasing concerns over space debris, nations should enhance their efforts to mitigate space debris generation and improve tracking and collision avoidance systems. Collaborative initiatives for debris removal and responsible satellite design should be promoted.

6. **International Cybersecurity Cooperation:** Recognizing the importance of cybersecurity in space activities, nations should promote international cooperation in developing and implementing cybersecurity measures for space assets. This includes protection against cyber threats and the development of guidelines for responsible behavior in cyberspace.

7. **Support Space Sustainability Initiatives:** Nations should support initiatives aimed at ensuring the sustainability of outer space activities. This includes adherence to best practices for satellite disposal, orbital slot allocation, and frequency coordination to avoid interference.

8. **Enhanced Oversight:** Establish an international oversight body, possibly under the United Nations, tasked with monitoring and regulating space activities, including the peaceful use of outer space and preventing its weaponization. This body should encourage transparency and information sharing among spacefaring nations.

9. **Promote Peaceful Cooperation:** Encourage spacefaring nations to prioritize peaceful cooperation in outer space, emphasizing the mutual benefits of scientific research, exploration, and commercial activities. Diplomacy and dialogue should be used to mitigate tensions and disputes in space.

10. **Public Awareness and Education:** Raise public awareness about the significance of outer space regulation and its impact on global security and prosperity. Educational programs and outreach efforts can help garner public support for responsible space practices.

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