Page 459 - 471 **DOI:** *https://doij.org/10.10000/IJLMH.118931*

INTERNATIONAL JOURNAL OF LAW MANAGEMENT & HUMANITIES

[ISSN 2581-5369]

Volume 8 | Issue 1

2025

Space Weaponisation and the International Legal Position regarding the Weaponisation of Space

HARIBALAKUMAR K.[1]

ABSTRACT

The modes of Warfare conducted by the states have been changed from the earlier period to present days in various aspects. As the technologies and the innovations developed, the weapons and the machines used in the war also becomes vigorous and more deadly. During both the World War I and II, the states used their air forces to fight against their enemies of war. In the end of the Second World War, the United States of America dropped the nuclear weapons named little boy and fat man in Japan. Thus, the scientific advancement were used for the destruction of our own human race. After the first space mission of Russia in 1957, the two most dominant powers of the world were more interested in capturing the space. From there the advancement in exploration of space developed tremendously. The International communities knew the threat that may be caused due to the weaponisation of outer space, and thus the United Nations General Assembly came up with the restrictions on the weaponisation of space in the Article IV of outer space treaty itself. But, still at present, there is an increase alarming situations which becomes a threat to the states through space weaponisations. This study deals with the laws relating to space weaponisation and the responsibility of states and legal principles regarding space weaponisation.

***Keywords**: Space Weaponisation, Modes of Warfare, Destruction of Human Race, State Responsibility.*

I. INTRODUCTION

If we move toward the weaponisation of space, we can bid farewell to the planet. The chances of survival are very slight.

\- NOAM CHOMSKY

Throughout history, warfare has evolved alongside advancements in technology, societal changes, and strategic thought. From primitive weapons and close-combat tactics of early humans to the organized formations of ancient civilizations like Greek hoplites and Roman

[1] Author is an Advocate in India.

 [ISSN 2581-5369]

legions, military strategy became increasingly sophisticated. The invention of gunpowder revolutionized warfare, introducing firearms and artillery, while the Industrial Revolution enabled mass production of advanced weaponry like machine guns and tanks. World Wars I and II showcased the devastating potential of mechanized and total war, with innovations such as radar, code-breaking, and nuclear weapons. The Cold War shifted focus to proxy conflicts, technological advancements, and the weaponization of space. The development of anti-satellite weapons and reconnaissance satellites underscored the strategic value of space-based assets, prompting a quiet arms race. While the 1967 Outer Space Treaty barred weapons of mass destruction in space, ambiguities left room for other forms of militarization, such as ASAT capabilities and defensive measures. Efforts to prevent a space arms race, like the PAROS Treaty, remained inconclusive, but a delicate balance of competition and collaboration emerged during this era, with both superpowers recognizing the potentially catastrophic consequences of unchecked weaponization.

II. WEAPONISATION AND MILITARIZATION IN SPACE

The creation, usage, and deployment of military resources and capabilities in space is referred to as "weaponization" or "militarization" of space. The expanding significance of space-based assets for military, commercial, and civilian uses as well as the improvements in space technology have brought this subject to the attention and concern of many in recent decades. Historically, space has been seen as a place for scientific research and peaceful exploration. But as countries have relied increasingly on space-based technologies for navigation, communication, reconnaissance, and surveillance, space has become more strategically important, which has prompted attempts to obtain a military edge in this area. The use of space for military objectives without necessarily placing weapons in orbit is known as "militarization of space." This covers tasks that have major military ramifications, such as early warning systems, communication, satellite reconnaissance, and navigation. For instance, military satellites support precision-guided weaponry systems, facilitate secure communication between military troops, and offer real-time intelligence.

However, the use of space-based assets to strike targets on Earth or in space itself is referred to as the weaponization of space, and it explicitly refers to the launching of weaponry systems into space. These armaments may consist of kinetic kill vehicles, directed energy weapons, anti-satellite (ASAT) missiles, and other devices intended to take out or destroy adversary satellites or space-based infrastructure. A number of legal, moral, and geopolitical issues are brought up by the possibility of space weaponization. The possibility of an arms race in space, which can

 [ISSN 2581-5369]

increase tensions between space-faring countries and result in the proliferation of lethal weaponry systems, is one of the main concerns. Furthermore, other satellites and spacecraft in orbit are seriously threatened by the debris left over from anti-satellite tests and space-based conflicts. This could result in a chain reaction of collisions known as the Kessler Syndrome, which could make some orbits useless for decades. The majority of space-faring nations have ratified the Outer Space Treaty of 1967, which forbids the construction of military bases, installations, or fortifications on celestial bodies in addition to the placement of nuclear weapons or any other kind of WMD in orbit around the Earth. However, there is opportunity for interpretation and possible loopholes because the treaty does not expressly forbid the use of conventional weapons in space.

Proposals for the peaceful use of space, arms control agreements, and diplomatic endeavors have all been used to try and stop the militarization or weaponization of space. Some proponents suggest that in order to encourage transparency, confidence-building measures, and cooperative efforts to solve shared security concerns, an international framework for space governance should be established, modeled after the current regimes for nuclear non-proliferation and disarmament. In summary, the militarization or weaponization of space poses a complicated and multidimensional problem that will have a big impact on global security, stability, and the advancement of space research and trade in the future. Innovative technology, cautious diplomacy, and a dedication to global cooperation will be needed to strike a balance between the legitimate security interests of space-faring states and the need to maintain space travel for peaceful purposes.

III. MILITARY PERSONNEL IN SPACE

Military troops in space constitute a young but possibly significant part of space exploration. Currently, no government has maintained a permanent military presence in space, and missions involving astronauts are primarily focused on scientific study and international collaboration. However, the possibility for a more militaristic future in space exists[2]. Proponents of a spacefaring military presence claim that it's important to secure critical space infrastructure such as communication and navigation satellites from attack. Additionally, they envision military troops performing space-based monitoring or perhaps partaking in future conflicts that reach beyond Earth's atmosphere. Opponents of militarization highlight fears about an arms race in space, which might lead to heightened geopolitical tensions and the development of debris fields that would imperil functioning spacecraft and future exploration attempts.

[2] Raphael Piliero et al., *The Future of Security in Space: A Thirty-Year US Strategy*, ATLANTIC COUNCIL (2021).

 [ISSN 2581-5369]

Furthermore, the ethical issues of weaponizing space and potentially endangering astronauts on both sides of a fight are serious considerations. The future of military people in space rests on international cooperation and prudent use of space technology. Treaties such as the Outer Space Treaty, which forbids the placement of weapons of mass destruction in space, can serve as a basis for ensuring space stays a domain for peaceful exploration and collaboration[3].

(A) Military Bases and Military Installations

The Outer Space Treaty clearly outlaws creating military outposts, facilities, and fortifications on celestial bodies[4]. However, the utilization of "any . . . facility necessary for the peaceful exploration of the moon and other celestial bodies" is allowed. This certainly provides potential for military sites to be erected in space. Theoretically, if a state were to create military facilities, installations, or fortifications in outer space, that conduct would appear acceptable under the Outer Space Treaty. There is no evident injury from the construction, hence it is unlikely that the Law of Armed Conflict would be triggered, and it seems that such an installation is legal. However, while the Outer Space Treaty permits for the construction of any facilities utilized for peaceful explorations of the Moon and other celestial bodies, what these facilities may consist of is not stated. Thus, if a military installation conformed to the benign goal of the Outer Space Treaty and was essential for peaceful exploration, it would appear to be lawful.

If the drafters wished to use the phrase "military base" in place of "facility" they may have replicated the "military bases, installations and fortifications" language used earlier in the treaty[5]. Rather, the term "facility" is used here, and a distinction is made for military personnel working in scientific research. Therefore, the facility stated in Article IV must indicate a facility that is not a military base, installation, or fortress. Further reason for this interpretation is obvious when considering Article IV. Military people undertaking scientific research is specifically mentioned. These individuals are not forbidden from functioning in outer space. This seems to indicate that there is a distinction about military bases, facilities, and fortifications. Under the Outer Space Treaty, it appears that in all situations these facilities are barred from celestial bodies[6]. However, floating a military facility or installation in outer space seems possible under the Outer Space Treaty.

Proponents envision these space bases serving a number of purposes: (a) Strategic Outposts: Space bases might function as strategic outposts, monitoring actions in Earth's orbit and beyond.

[3] UN General Assembly, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, GA Res 2222 (XXI), (1966)
[4] The Outer Space Treaty, 1967, art IV
[5] *Ibid.*
[6] *Ibid.*

 [ISSN 2581-5369]

This could involve tracking possible hazards like asteroids or foreign space programs, giving important intelligence for national security purposes. Imagine a space station positioned strategically to monitor essential infrastructure like communication satellites or keep a watch on possible rivals' space operations. (b)Logistics and Maintenance Hubs: Space bases could function as logistics and maintenance hubs for spacecraft. They might house facilities for refueling, repairs, and construction of spacecraft, facilitating a more permanent human presence in space. Consider a space station equipped with docking ports, robotic arms, and workshops to service and maintain a fleet of spaceships for scientific investigation or other missions. (c) Command and Control Centers: In a more militarized future, space bases could become command and control centers for spacefaring military activities. These centers could house people responsible for managing space-based weaponry or coordinating military activity in orbit.

IV. REASON FOR WEAPONISATION OF SPACE

The potential weaponization of space derives from a complex interplay of strategic aspirations, technological breakthroughs, and a perceived necessity to secure national interests in a new area. Here's a breakdown of the primary drivers: (a) Maintaining Military control: Some governments consider space as the next frontier for military control. By creating space-based weaponry or enhanced monitoring capabilities, they attempt to acquire a strategic advantage over potential rivals. Imagine a scenario where a government develops a network of laser-armed satellites to repel attacks or damage hostile spacecraft. (b) Countering Emerging Threats: The increased reliance on space-based infrastructure for communication, navigation, and intelligence gathering has heightened worries about vulnerability to assault. Nations may feel forced to develop weapons systems to discourage attacks on these important assets or preemptively destroy possible threats. (c) Technological Advancements: The rising availability and downsizing of strong lasers and other directed energy technologies are blurring the barriers between science fiction and reality. As these technologies evolve, the prospect of deploying them in space becomes a more concrete possibility, potentially impacting military doctrines. (d) The Erosion of Trust and Cooperation: A fall in international cooperation on space exploration and a rise in geopolitical conflicts on Earth can spill over into the space domain. If states regard each other's space projects as a danger, the urge to build countervailing capabilities, including weapons, can rise.

(A) Consequences of Weaponisation

The weaponization of space poses a multiplicity of threats, touching everything from

international security to the future of space exploration[7]. Here's a breakdown of the primary consequences:

a) **Destabilizing Arms Race:** A space arms race could ignite a dangerous escalation, with states seeking for superiority in space-based weaponry[8]. Consider a future where constellations of laser-armed satellites bristle in space, each nation terrified of the other's capabilities. This not just diverts resources away from peaceful space exploration but also generates a permanent climate of tension and mistrust, threatening international cooperation in space projects.

b) **Debris Catastrophe:** Weapons testing and anti-satellite (ASAT) assaults might create a catastrophic debris field. Collisions in orbit, even among small objects, can cause cascading debris clouds[9]. These fields might harm operating spacecraft, research satellites, and perhaps the International Space Station (ISS) for decades to come[10]. The potential repercussions for future space exploration and the safety of astronauts are significant.

c) **Loss of key Infrastructure:** Space-based weapons could possibly destroy or cripple key infrastructure, like communication and navigation satellites[11]. This could disrupt communication networks, impair GPS systems, and have a cascade effect on global economy and security. Consider a situation where a single attack takes out a constellation of communication satellites, throwing large regions into darkness and confusion.

d) **Ethical Dilemmas:** The possible employment of space weaponry presents substantial ethical considerations. Unlike conventional warfare, space fighting might imperil not just military people but also astronauts doing scientific study or citizens reliant on space-based infrastructure. The risk for inadvertent escalation owing to miscalculations or misinterpretations is substantial. Imagine a circumstance where a faulty satellite is

[7] Weapon delivery systems and space security, https://www.eda.admin.ch/eda/en/fdfa/foreign-policy/security-policy/disarmament-non-proliferation/traegersysteme-und-weltraumsicherheit.html (last visited Jan 15, 2025).
[8] Analysis: What are the potential geopolitical implications of Russia's purported space weapon? | PBS News, https://www.pbs.org/newshour/world/analysis-what-are-the-potential-geopolitical-implications-of-russias-purported-space-weapon (last visited Jan 15, 2025).
[9] Tereza Pultarova published, *Colliding Space Junk Makes "noise" That Could Be Heard from Earth*, SPACE.COM (2023), https://www.space.com/colliding-space-junk-emits-detectable-signal (last visited Jan 15, 2025).
[10] Russian ASAT Test Creates Massive Debris | Arms Control Association, https://www.armscontrol.org/act/2021-12/news/russian-asat-test-creates-massive-debris (last visited Jan 15, 2025).
[11] NATO Review - Protecting our critical satellite infrastructure: the importance of space-based infrastructure to humanity and its status within NATO, NATO REVIEW (2023), https://www.nato.int/docu/review/articles/2023/10/24/protecting-our-critical-satellite-infrastructure-the-importance-of-space-based-infrastructure-to-humanity-and-its-status-within-nato/index.html (last visited Jan 15, 2025).

misinterpreted for a hostile weapon, leading to a chain reaction of attacks and potentially disastrous effects.

e) **Threat to Peaceful Exploration:** The weaponization of space could substantially hamper future space exploration initiatives[12]. The presence of debris fields and the persistent possibility of attack could make space travel prohibitively risky, threatening our capacity to explore the cosmos and potentially discover new resources or information.

These are only some of the potential repercussions of weaponizing space. By prioritizing international cooperation, ethical use of space technology, and a dedication to peaceful exploration, we can ensure that space remains a realm for scientific growth and collaboration for the benefit of all humankind.

V. LEGAL PRINCIPLES REGARDING WEAPONISATION OF SPACE

a) State Responsibility

Due to the structure of the international legal system and the theories of state sovereignty and state equality, state accountability is a fundamental principle of international law. It stipulates that anytime one state violates another state's international law, there is an international obligation between the two. A violation of an international agreement results in the need for compensation. As a result, the emphasis is on second-order principles, or the procedural and other repercussions that follow a violation of a substantive rule of international law. The link between the principles governing state responsibility and those pertaining to other areas of international law has given rise to a variety of challenges as a result. Whether there is a connection between the rules of state responsibility and those relating to the law of treaties arose. State responsibility is the term for a nation-state's culpability for any transgression of international law. Hugo Grotius' legal maxim, which states that every mistake results in a duty to make up the losses, serves as the foundation for this requirement.

The International Law Commission's adoption of the Draft Articles on the Responsibility of States for Internationally Wrongful Acts (Draft Articles) in August 2001 is significant in terms of the laws controlling the same. The Draft paragraphs explain state accountability and offer several remedies for any violations, including consequential restitution, reparation, non-repeatable assurances, and others.[13] State accountability is the legal obligation that an

[12] Rahul Rao published, *New Space Arms Race Could Hinder Exploration Efforts*, SPACE.COM (2022), https://www.space.com/space-weapons-hinder-exploration-efforts (last visited Jan 15, 2025).

[13] John R. Crook, *The United Nations Compensation Commission—A New Structure to Enforce State Responsibility*, 87 AM. J. INT. LAW 144 (1993).

international law-abiding state has to answer for its deeds or omissions that violate international law or hurt other states or people. This idea is crucial to the functioning of the international legal system because it ensures that nations are accountable for their actions and may be held accountable for any wrongdoing. The basis for determining state responsibility is international law, which includes treaties, customary international law, and overarching principles accepted by civilized nations. The entire foundation for evaluating state liability is provided by the International Law Commission's Articles on State liability, which were enacted in 2001.

b) Use of force in international law

According to Article III of the Outer Space Treaty, states parties to the Treaty are required to conduct their operations in the exploration and use of outer space in compliance with international law, including the Charter, with the goal of preserving peace and security in outer space and fostering international cooperation. Therefore, it is imperative that any discussion of the military's use of outer space include a brief mention of the broad norms on the use of force set forth by international law. One of the primary goals of the UN is to maintain international peace and security; as such, member states are obligated to resolve international disputes amicably[14]. Article 2(4) of the United Nations Charter states that in their international dealings, all member states must not threaten or use force against the political independence or territorial integrity of any state. Only two situations are allowed by the Charter for the use of force: first, when the Security Council[15] has the authorization to do so, and second, when states use Article 51's right to individual or collective self-defense. Many people consider the ban on using force without authorization to be a part of customary international law.

In actuality, there are three situations in which the use of force can be lawfully justified:

1. it is intended and limited to individual or collective self-defense, including possibly preemptive self-defense;
2. it is required by a resolution adopted by the UN Security Council in accordance with Article 42 of its Charter; or
3. Contentiously, it is employed in favor of humanitarian interventions[16].

Upon examining state practices concerning the use of force since 1945, one could immediately

[14] See Article 1 and 2(3) of the Charter of the United Nations (1945) (UN Charter)
[15] If the Security Council decides that a certain circumstance qualifies as a "threat to the peace, breach of the peace, or act of aggression" under Article 39 of the Charter, it may act under Chapter VII of the UN Charter. In such a scenario, the Security Council can adopt suitable actions as specified in Charter Articles 40, 41, or 42.
[16] W. Reisman, *Unilateral Action and the Transformations of the World Constitutive Process: The Special Problem of Humanitarian Intervention*, 11 EUROPEAN JOURNAL OF INTERNATIONAL LAW 3 (2000).

 [ISSN 2581-5369]

conclude that this concept is upheld more in its violation than in its compliance. However, in Military and Paramilitary Activities in and Against Nicaragua (Merits), the International Court of Justice declared that "whether or not a State's conduct is in fact justifiable on that basis, the importance of that attitude is to confirm rather than to weaken the rule." If a State acts in a way that is prima facie incompatible with a recognized rule, but defends its conduct by appealing to the exceptions or justifications included within the rule itself, then the State's conduct is nonetheless justified on that basis[17]. As a result, it can be persuasively argued—and most publicists would concur—that states currently employ force on Earth exclusively and lawfully under those three situations.

It should be emphasized that the United Nations Charter does not place any prohibitions on any other military activity, with the exception of the ban on using military force as an act of aggression. Article 2(4) of the Charter, for instance, does not mention any specific weapons when it requires states to refrain from using force in their international dealings[18]. In order to preserve international peace and security, military operations that do not include the use of force in the context of peacekeeping may, in fact, be authorized under Chapters VI and VII of the Charter[19]. Therefore, it may be claimed that, in accordance with the terms of the Outer Space Treaty, such operations would be both legal and considered to be in the interest of preserving international peace and security. Therefore, one could argue that a state's use of conventional weapons for such objectives in Earth orbit complies with the Outer Space Treaty's normative framework.

c) Application of Article IV of The Outer Space Treaty

Article III of the Outer Space Treaty influences the application of Article IV by emphasizing compliance with the United Nations (UN) Charter and broader international law. While the UN Charter takes precedence in cases of conflict due to Article 103, Article IV's restrictions generally supersede prior treaties unless a jus cogens norm or Security Council authorization under Article 42 of the UN Charter applies. Article 2(4) of the Charter prohibits force against states, a principle recognized as jus cogens. However, Article 42 allows the Security Council to use force for international peace and security, potentially overriding Article IV's prohibitions. The right to self-defense under Article 51 of the UN Charter is inherent and not a treaty obligation, meaning it does not conflict with Article IV of the Outer Space Treaty unless justified as a jus cogens norm. Article IV's restrictions, such as the prohibition of nuclear

[17] Military and Paramilitary Activities in and against Nicaragua (ICJ-merits), para 186 (1986).
[18] Ibid, at para. 39
[19] Certain Expenses of the United Nations (International Court of Justice), at 167 (1962).

weapons in space and demilitarization of celestial bodies, remain enforceable unless superseded by higher norms or Security Council decisions.

Interpretation of Article IV's "exclusively peaceful purposes" norm affects its scope. A narrow reading limits its applicability to explicitly listed activities like building military bases or testing weapons. By contrast, a broader interpretation could extend restrictions to all military actions in space. The absence of terms like "attack" or open-ended language suggests a restrictive scope, applying primarily to prohibited activities in peacetime. Historical debates, such as those surrounding the Strategic Defense Initiative (SDI) of the 1980s, illustrate differing interpretations of Article IV. The SDI, which proposed missile defense systems using lasers and particle beams, was considered compliant by some analysts under a restrictive reading of Article IV. Others argued it violated the treaty under a broader interpretation. This debate highlighted the complexities of applying Article IV in a militarized space context and its interaction with other international norms.

In summary, Article IV of the Outer Space Treaty imposes specific restrictions on military activities in space, but its application is shaped by interpretations of its language, its interplay with jus cogens norms, and UN Charter provisions like self-defense and Security Council actions.

d) Treaty banning nuclear weapon tests in the atmosphere in outer space and under water, 1963

The United States and the Soviet Union experienced a tense standoff in the decades that followed World War II. The creation and testing of nuclear weapons came to represent this rivalry in a deadly way. Both sides carried out atmospheric nuclear tests in the 1950s, which resulted in radioactive fallout that was released into the environment and caused long-term environmental harm and public health issues worldwide[20]. International initiatives to restrict nuclear testing found fertile ground thanks to public concern over the consequences from these tests and growing fears of nuclear war[21]. The 1963 agreement, sometimes referred to as the Partial Test Ban Treaty (PTBT) or the Limited Test Ban Treaty (LTBT), aimed to prohibit nuclear testing in particular areas: (1) Banned Environments: The treaty forbade the testing of nuclear weapons or explosives in the atmosphere, outer space, and beneath the ocean. This was done in an effort to reduce the health dangers connected with radioactive fallout. (2) It Allowed

[20] United Nations, *End Nuclear Tests Day - History*, UNITED NATIONS, https://www.un.org/en/observances/end-nuclear-tests-day/history (last visited Jan 15, 2025).
[21] Nuclear Test Ban Treaty | JFK Library, https://www.jfklibrary.org/learn/about-jfk/jfk-in-history/nuclear-test-ban-treaty (last visited Jan 15, 2025).

Underground Testing: One of the treaty's main restrictions was that it permitted nuclear testing to take place underground[22]. This was a yield to the Soviet Union, which was concerned about spot checks to ensure that a total prohibition was being followed. (3) Verification Mechanisms: In order to identify subterranean testing, the treaty devised a crude verification mechanism that relies on already-existing seismic monitoring stations.

Nevertheless, the treaty's ability to prevent nuclear testing in any form was hindered by the absence of on-site inspectors. Despite these drawbacks, the LTBT had a very beneficial effect: (1) Lessened Radioactive Fallout: The global public health outcomes have improved as a result of the drastic reduction in radioactive fallout caused by the prohibition on atmospheric testing. This was a significant win for the preservation of the environment. (2) Psychological Thaw: By indicating that the US and USSR were open to having talks about armaments control, the treaty somewhat reduced Cold War tensions. (3) Non-Proliferation Precursor: The Nuclear Non-Proliferation Treaty (NPT) of 1968 and several subsequent nuclear non-proliferation agreements were made possible by the LTBT. But there were also repercussions to the treaty's limitations: (1) Underground Testing Persisted: Although maybe at a reduced intensity, the nuclear arms race persisted as long as underground testing was permitted[23]. (2) Verification Challenges: Due to the restricted verification system, it was challenging to conclusively establish or refute infractions, which led to worries about possible cheating. (3) Nuclear Deterrence: Some said that by making it more difficult for nations to test and enhance their nuclear arsenals, the pact undermined nuclear deterrence.

In nuclear arms control history, the Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space, and Under Water is a noteworthy, if not faultless, turning point. (1) A Shared Commitment: By demonstrating that the US and USSR could reach an agreement on nuclear weapons, the treaty opened the door to additional communication. (2) Environmental Protection: One of the first instances of international collaboration in tackling environmental issues related to nuclear weapons was the prohibition on atmospheric testing. (3) A Basis for Advancement: The LTBT prepared the way for more extensive agreements such as the NPT, which sought to eradicate nuclear weapons entirely. The 1963 pact is still an essential reminder of the risks associated with the Cold War and the continued necessity of nuclear weapons limitation. It was a significant step in stopping the nuclear arms race and shielding the environment from radioactive fallout, even if it did not completely end nuclear testing. The

[22] Freedman, Lawrence D. *"Nuclear Test-Ban Treaty"*. ENCYCLOPEDIA BRITANNICA (2023) https://www.britannica.com/event/Nuclear-Test-Ban-Treaty. (last visited 14 April 2024).
[23] Why the CTBT remains an elusive goal, ORFONLINE.ORG, https://www.orfonline.org/research/ctbt-remains-an-elusive-goal (last visited Jan 15, 2025).

 [ISSN 2581-5369]

lessons from the LTBT are still important today, as we battle the threat of nuclear weapons and are encouraged to work toward a world free from the threat of nuclear destruction.

VI. SUGGESTIONS

International Cooperation and Norms:

1. Strengthen Existing accords: Reinforce existing accords like the Outer Space Treaty (1967) that ban installing weapons of mass devastation in space.
2. Develop New Regulations: Negotiate new international agreements to ban specific types of space weapons (such kinetic ASATs) or limit their development and testing (akin to the US ASAT testing ban).
3. Promote Transparency and Confidence Building: Encourage information sharing and conversation amongst spacefaring states to reduce mistrust and miscalculations.

Alternative Security Measures:

4. Focus on Defensive Measures: Develop technologies and processes for protecting key space infrastructure from attack (e.g., hardening satellites, debris mitigation strategies).
5. Cybersecurity Cooperation: Coordinate internationally to establish cybersecurity measures to protect space systems from cyberattacks.

Peaceful Uses of Space:

6. Promote Scientific Collaboration: Foster international collaboration in space exploration and research to foster a feeling of shared purpose and emphasize the benefits of peaceful space exploration.
7. Economic Cooperation: Encourage cooperative commercial space projects to create economic interdependence and disincentivize weaponization.

VII. CONCLUSION

The weaponization of space presents significant challenges to global security, stability, and the sustainability of outer space operations. Despite historical and technological advancements, along with international treaties like the Outer Space Treaty, gaps in legal frameworks allow states to exploit loopholes for military activities under the guise of peaceful research. The development of anti-satellite (ASAT) weapons, directed-energy technologies, and cyber capabilities heightens the risk of conflict and threatens critical space infrastructure used for communication, navigation, and surveillance. Incidents like Russia's 2021 ASAT test highlight the grave issue of space debris, which endangers future exploration and amplifies concerns over

 [ISSN 2581-5369]

phenomena like Kessler Syndrome. Although initiatives like the U.S.-led self-imposed ASAT test ban and broader diplomatic measures aim to reduce risks, these efforts remain non-binding and insufficient to curb militarization. Major space-faring nations such as the U.S., Russia, and China, driven by rivalry and the pursuit of dominance, continue to develop space-based weapons, often under the justification of self-defense. This intensifies the threat to the space environment and global stability. The international community must adopt collaborative approaches, including enhanced transparency, binding arms control agreements, and accountability mechanisms, to preserve outer space as a realm for peaceful exploration and shared benefit.

*****

 [ISSN 2581-5369]