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Original Article

Protecting Satellite Telecommunication by Limiting the Use of Anti-Satellite Weapons Under International Space Law

Kania Maharani[1], Aktieva Tri Tjitrawati[2], Sinar Aju Wulandari[3*]

[1-3]Department of Law, Faculty of Law, Universitas Airlangga, Surabaya, Indonesia
Email: [3)] sinar.aju@fh.unair.ac.id

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Abstract

The increasing utilization of outer space has brought about unprecedented opportunities and potential security challenges. The development of anti-satellite (ASAT) weapons has raised concerns about the militarization of space and the potential for conflict. This research examines the legal framework governing ASAT weapons under international space law, focusing on the Outer Space Treaty (OST) and the International Telecommunication Union (ITU) Radio Regulations. It analyzes the limitations of existing legal instruments in addressing the threats posed by ASATs, particularly their potential to generate space debris and disrupt critical satellite infrastructure. This research adopts normative (doctrinal) legal methods by incorporating statutes and conceptual frameworks to analyze primary and secondary legal sources in order to investigate legal standards regarding militarization and disarmament in space. This research highlight that the current legal framework is insufficient to prevent the proliferation and use of ASAT weapons and proposes the development of a new international treaty specifically addressing ASATs. This treaty would provide clearer definitions, stricter regulations, and stronger enforcement mechanisms to ensure the long-term sustainability and security of space activities. This research also explores the role of the ITU in promoting the peaceful and responsible use of outer space through its Radio Regulations and technical expertise. The findings emphasize the need for greater cooperation between the ITU and other international organizations to address the challenges posed by ASAT weapons and ensure the continued benefits of space technology for all humankind.

Keywords: Anti-Satellite Weapons, International Space Law, ITU Radio Regulations.

1. Introduction

In recent years, the utilization of outer space has expanded significantly, bringing both unprecedented opportunities and potential security challenges. Nations strive to assert their presence beyond Earth's atmosphere as the field is becoming increasingly congested and competitive, the need for a comprehensive framework on disarmament in outer space has become increasingly apparent (Neto, 2015). Delving into the intricacies of incorporating disarmament measures within the scope of arms control for space security, seeking to navigate the delicate balance between technological advancements and legal stability. As countries compete with each other for dominance, Anti-satellite weapons development underscore the growing significance of militarizing space. The quest for supremacy extends beyond terrestrial boundaries, with nations recognizing the strategic advantages derived from mastering the high ground of outer space. This ascent into space supremacy is not solely characterized by the peaceful utilization of satellites. The development of outer space weaponry introduced a new dimension to the arms race beyond Earth's atmosphere.

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The preservation of outer space for peaceful purposes can be traced back to the late 1950s when deliberations commence at the United Nations. During this pivotal period, the United States and its western allies took a proactive stance, presenting a proposal in 1957 aimed at dedicating space exclusively to peaceful and scientific endeavors (Koplow, 2009). This proposal marked an initial step toward formalizing international agreements on the responsible use of outer space. The culmination of these early discussions materialized in 1963 when the UN General Assembly adopted two significant resolutions on outer space. These resolutions laid the foundation for what would later evolve into the outer space treaty, a landmark document that shapes the legal framework governing activities beyond Earth's atmosphere.

By the 1985 OTA Project Staff on New Ballistic Missile Defense Technologies book stated for more than twenty years, the United States and the Soviet Union have leveraged satellites for military applications. Technological advancements are poised to significantly enhance the role of these space-based assets in earthly warfare. Future military satellites will provide a wider range of information, delivered faster and to a broader array of locations. Some will even directly engage in combat functions, such as identifying targets, tracking them, and evaluating the effectiveness of attacks. This expanding military utility, however, makes satellites increasingly vulnerable to attack. Both the Soviet Union and the United States are actively developing Anti-Satellite in further writing will be referred to ASAT weapons (Raju, 2021).

Launching a preemptive attack might seem like a tempting way to neutralize enemy ASATs. However, this strategy creates a dangerous situation where both sides fear being attacked first. In such a tense environment (crisis situation), any event could trigger a devastating conflict. One key resolution, UN Resolution 1884 emphasized the importance of preventing the militarization of outer space (Marinich & Myklush, 2023). It specifically called upon nations to refrain from stationing Weapons of Mass Destruction further will be referred as WMD in space, reflecting a shared commitment to maintaining a peaceful nature of celestial exploration. Another pivotal resolution, UN resolution 1962, delineated essential legal principles concerning outer space exploration. It enshrined the principle that all countries possess the inherent right to freely explore and utilize outer space. This foundational principle underscored the inclusive nature of space exploration affirming that the benefits of cosmic discovery are a common heritage for all nations.

In essence, these early UN resolutions provided the groundwork for the outer space treaty, establishing a framework that transcends national boundaries and promotes cooperation in the peaceful and responsible exploration of outer space. This legal foundation reflects the collective aspiration to safeguard outer space. However, the endeavor to prevent an outer space arms race is marked by two contrasting approaches, each proposing distinct strategies to address the looming challenges. The first approach advocates for fostering responsible behaviors through voluntary commitments. In essence, nations are encouraged to voluntarily commit to specific guidelines and standards governing their activities in outer space. This strategy relies on the cooperative spirit of nations and the assumption that responsible conduct can be achieved through mutual agreement and shared principles.

On the other hand, the second approach takes a more stringent stance, calling for the early commencement of negotiations on a legally binding instrument. This implies the development of a formal and enforceable international agreement that mandates specific restrictions and obligations concerning the militarization of outer space. Unlike voluntary commitments, a legally binding instrument carries the weight of international law, holding nations accountable for their actions in space and providing a more robust framework for regulating behavior. Ultimately, the contrasting approaches highlight the complexities

involved in finding comprehensive and universally acceptable solutions to the challenges posed by the militarization of outer space.

The 1967 Outer Space Treaty establishes comprehensive restrictions on military activities in space and on celestial bodies (Vlasic, 1967). It mandates that signatory nations cannot place nuclear weapons or other weapons of mass destruction in Earth's orbit, install them on celestial bodies, or position them anywhere else in outer space. The treaty designates the moon and other celestial bodies as zones reserved exclusively for peaceful activities. It explicitly bans the creation of military bases, installations, and fortifications on these bodies, as well as weapons testing and military exercises. However, the treaty does permit the use of military personnel for scientific research and other peaceful objectives, and allows any equipment or facilities needed for the peaceful exploration of celestial bodies. In simpler terms, the treaty prevents countries from positioning nuclear weapons or other weapons of mass destruction in space. While "weapons of mass destruction" doesn't have an exact definition, it's commonly understood to include nuclear, chemical, and biological weapons. Importantly, the treaty doesn't prohibit the launching of ballistic missiles, even though these missiles might carry weapons of mass destruction warheads as they travel through space. The treaty consistently underscores the use of space for peaceful pursuits, prompting some analysts to suggest a broad interpretation that extends beyond the prohibition of only weapons of mass destruction in outer space to encompass various weapon systems.

Militarization of outer space and the conduct of space is increasingly militarized, as China and Russia are actively enhancing their space capabilities to attain military objectives and decrease dependence on U.S. space systems (Koplow, 2009). They have introduced military reforms, establishing new military forces dedicated to deploying space and counter-space capabilities, regularly incorporating them into military exercises. Concurrently, both nations persist in advancing, testing and deploying advanced anti-satellite weapons, posing a threat to United states and allied space assets. The growing involvement of multiple nations in space activities and the emergence of advanced commercial space capabilities are contributing to the increased complexity of the space domain. Policymakers are actively working to comprehend the national security and foreign policy ramifications of this evolving landscape. Some contend that existing laws and treaties are outdated and ill-suited to address the contemporary utilization of space.

Anti-satellite weapons are space weapons engineered to disable or to eliminate satellites for strategic or tactical objectives, as it is one of the primary security concerns surrounding the weaponization of space (Crane, 2021). One proposed solution, “salvage fusing,” aims to automatically destroy enemy ASATs if their own satellites are attacked. While this could reduce the risk of preemptive strikes, it introduces a new danger: accidental war. A natural event, like a meteoroid hitting a satellite, could trigger a cascade of self-destruction (chain reaction) wiping out all satellites. A safer approach would be to prioritize defensive measures (protection) that don’t involve attacking first “shoot-back” tactics.

The emergence of kinetic anti-satellite weapons (kinetic ASATs) presents a grave threat to satellite communication infrastructure. These weapons directly destroy satellites, causing catastrophic disruption of critical services. Further complicating the issue is a tactic known as “demonstration destruction.” In this chilling display of power, some states intentionally demolish their own satellites using kinetic ASATs. This serves as a stark warning, demonstrating their capability to cripple the satellite networks of rival nations. The rationale is simple: if they can destroy their own with ease, then enemy satellites are equally vulnerable. The consequences of deploying kinetic ASATs are potentially devastating. These weapons can inflict a triple threat on satellite communications: complete physical destruction of the satellite

or its ground station, the malicious scattering of space debris, or a combination of both. Any of these scenarios can render a satellite completely inoperable. Based on the background of the problem as described above, this study has the following objective, namely to analyze the existence of a legal void in regulating anti-satellite in outer space.

2. Methods

This study is classified as legal research; the objective of legal research is to uncover the coherence between legal rules and norms (Marzuki, 2016). This study employs normative legal research, also referred to as doctrinal research, involving the analysis of relevant laws and regulations. This approach will be utilized to elucidate and examine legal rules concerning space militarization and disarmament in space. The approach method used to answer the problem formulation in this research includes statute approach and conceptual approach. The purpose of this research is to enhance legal understanding and offer guidance when assessing limitations and legal voids related to potential militarization of outer space. The approach method used to answer the problem formulation in this research includes statute approach and conceptual approach. To analyze legal issues in this research, the author uses two types of legal material sources, namely primary legal materials secondary legal materials.

3. Results and Discussion

3.1. Satellites as Critical Infrastructure

According to NASA (2023), Satellite is defined as something that orbits. A planet or a star is considered as a satellite including the moon as it orbits earth, when a spacecraft orbits around the earth it is also considered with the term “satellite”. Though the earth and the moon are considered as a natural satellite, the term “satellite” that will be used in this research will refer to the definition of artificial, or man-made, orbiting satellites.

As satellites play a vital versatile role in gathering invaluable information about landforms, weather patterns, and bodies of water as well as communication information and ensuring for daily commutes therefore, in essence, their reach extends far beyond what we can see with the naked eye, shaping each nation in countless ways. While vital for civilian purposes, satellites are equally essential for ensuring secure communication between the military and government. Given the vital role of satellites especially in modern life, satellites potentially receive and be targeted to disrupt communication, navigation, and other vital services. These weapons designed to disable or destroy satellites are known as Anti-Satellite weapons or used in abbreviation as ASATs.

ASATs are divided into the types that use forces and that don’t, Kinetic energy ASATs and non-kinetic energy ASATs. Kinetic energy ASATs formed from ballistic missiles to drones to other satellites that physically essentially collided with their target satellites. Non-kinetic ASAT uses non-physical attacks such as cyber-attacks, jamming of communication signals to render them useless, or high-powered lasers to temporarily or permanently blind their sensors. These attacks can be launched from airborne vehicles, satellites in close proximity or even ground-based installations. The key technologies behind these systems involve tracking enemy satellites without cooperation, guiding the projectile to its target on its own, and precisely releasing the warhead at the right moment. These missiles can be launched from land, underwater, airplanes, or even space. They come in two main types: ground-based and sea-based. Both pack a powerful punch using a high-speed interceptor instead of explosives. This interceptor has all the tools it needs to track, chase down, and destroy enemy satellites.

It has a seeker to find its target, guidance systems to navigate, and even small rocket engines to change course in space. Onboard systems keep it cool and fueled. Finally, it carries the weapon itself, which can either be a solid object or an explosive that creates a destructive cloud of debris. In combat, a powerful booster rocket launches the interceptor into space at high speed, where it can maneuver to intercept the target's orbit. By releasing the high- speed warhead or triggering an explosion, the missile destroys the enemy satellite by smashing into it or creating a debris field in its path.

Besides the obvious attacks aiming to intercept, corrupt or seize control of space systems for various purposes, the consequences of space debris are also a serious concern. A closer look into the impact reveals ASAT tests also escalate in the debris field endangering the other operational satellites by collision thus making it possible for the phenomenon of Kessler Syndrome in which it describes a critical point of space debris growth, The escalating threat of debris from anti-satellite (ASAT) tests underscores the dangers outlined by the Kessler Syndrome. This theory proposes a domino effect, a rapid increase in space debris could reach a critical point, triggering a chain reaction of collisions. Existing debris would shatter into countless smaller pieces, creating a perilous environment for operational satellites, crewed missions (endangering astronauts), and future space exploration. This scenario would severely limit humanity's ability to utilize space peacefully, potentially constituting a violation of international space law.

Maintaining adherence to space law principles has been a challenge, with several instances of states testing or deploying anti-satellite weapons. These events have underscored the need for greater clarity and stricter enforcement of existing regulations, as well as potential new agreements specifically addressing emerging threats in space. The aforementioned challenges posed by anti-satellite weapons, particularly their potential to generate long-lasting space debris, may constitute a breach of established space law regulations. Specifically, such actions could breach the following space law principles: OST Article I: This article guarantees the *"free exploration and use of outer space by all States Parties on a footing of equality and in accordance with international law"*.

OST Article VI prohibits states from placing nuclear weapons or other weapons of mass destruction in Earth's orbit. While ASATs themselves might not be WMDs, their debris-generating nature could be argued to hinder peaceful uses of space. As today, in low-earth orbit, objects collide, reaching approximately 23,000 mph. Even this minuscule debris is able to crack the window on the International Space Station. Currently, China, Russia, the United States, and India are the countries believed to possess Anti-Satellite (ASAT) capabilities (Mastalir, 2009). In light of their destructive potential, the use of ASAT weapons can disrupt telecommunications infrastructure in several ways, including kinetic energy, kinetic energy as mentioned previously that are able to launching a projectile (missile or object) at the communication satellite. The impact destroys the satellite, rendering it inoperable and creating debris. Unlike certain missile-based ASATs, kinetic kill vehicles exhibit a deficiency in target discrimination capabilities. This results in the potential destruction of non-military satellites or debris from past ASAT tests, further aggravating the space debris predicament. A direct hit from the kinetic kill vehicle obliterates the communication satellite. Essential components, including antennas, delicate electronics, and the very frame itself, are pulverized or critically compromised, ensuring the satellite's complete failure. As well as direct-energy methods that Directed-energy weapons, employing high-powered lasers or microwaves, can disrupt critical components within the communication satellite. This disruption can potentially jam its communication functions or inflict permanent damage, rendering it inoperable.

3.2. Challenges to International Space Law

The vast expanse of space presents unique challenges to the established frameworks of international law, treaties promoting space cooperation are a fragile shield against a growing threat (Lachs, 2010). The gaping hole in enforcement mechanisms leaves international law powerless to stop the development of ASAT weapons, which could cripple communication networks worldwide, plunging nations into chaos. The 1967 Outer Space Treaty establishes comprehensive restrictions on military activities in space and on celestial bodies. It mandates that signatory nations cannot place nuclear weapons or other weapons of mass destruction in Earth's orbit, install them on celestial bodies, or position them anywhere else in outer space. The treaty designates the moon and other celestial bodies as zones reserved exclusively for peaceful activities. It explicitly bans the creation of military bases, installations, and fortifications on these bodies, as well as weapons testing and military exercises. However, the treaty does permit the use of military personnel for scientific research and other peaceful objectives, and allows any equipment or facilities needed for the peaceful exploration of celestial bodies. Drafted in 1967 at the height of the Cold War, the OST prioritized preventing a space-based arms race. Its primary concern was the proliferation of WMDs like nuclear weapons, not conventional weaponry like ASAT technology. This focus is reflected in the treaty's lack of a clear definition for "weapon" within the spacefaring context. This ambiguity creates loopholes.

The OST 1967 emphasizes peaceful exploration and use of outer space throughout its introduction and Article IV (Kerrest, 2011). This article specifically mandates the exclusive use of the Moon and other celestial bodies for peaceful purposes. However, the definition of "peaceful" is debatable. Some argue it signifies non-military activities. This interpretation is debatable since the spacefaring era began with a degree of militarization. Nations have deployed military personnel on space missions and openly utilized space for military functions like reconnaissance and communication. Therefore, within the context of the OST 1967, "peaceful" likely implies non-aggressive actions rather than a complete absence of military involvement. ASATs are inherently offensive and would violate the treaty. However, testing ASATs against a nation's own satellites wouldn't necessarily be a violation. Article IX of the 1967 Outer Space Treaty outlines a two-fold process for preventing conflict. It mandates that any nation signed onto the Treaty must engage in suitable international discussions prior to moving forward with a planned space activity whether carried out by itself or its citizens if that nation has cause to suspect the activity could result in interference that is potentially harmful to the peaceful space operations of other member states. This applies to all of outer space, encompassing the Moon and all other celestial bodies. In a corresponding manner, the treaty also empowers any member state to call for consultations regarding a planned activity if that state has grounds to suspect another nation's planned actions could produce similarly detrimental interference with the peaceful exploration and use of the space environment.

This statement imposes an additional duty on nations, it requires states to engage in "appropriate international consultations" before undertaking any activity that might cause "potentially harmful interference" with other countries' space endeavors, if they have "reason to believe" this could happen. The wording does introduce some subjectivity. A nation's obligation to consult hinges on them having a reason to suspect their activity might be disruptive. However, regardless of the specific details of consultation, some form of communication is mandated even a basic notification or announcement could suffice. Despite this requirement, none of the countries that conducted destructive ASAT tests initiated any consultations, even though they likely knew their actions would generate significant space

debris, impacting other nations. This lack of consultation, considering the potential consequences, can be seen as a violation of Article IX.

Beyond the OST, the 1972 Convention on International Liability for Damage Caused by Space Objects (Liability Convention) also addressed the dangers of ASAT but only the damages of its debris. This treaty lays out two key scenarios where liability would come into play. According to the Liability Convention (1972) The convention focuses on physical damage caused by space objects (G.W et al., 2021). Article II stipulates that a space object is absolutely liable for compensating any damage that object may cause on the Earth's surface or to aircrafts in flight. The 1972 Liability Convention focuses primarily on compensating for physical damage caused by space objects hitting things on Earth or another spacecraft. While this was a crucial first step, it doesn't fully address the complexities of the space age we live in today. In essence, the Liability Convention, while a significant treaty, leaves a significant gap in legal frameworks for effectively managing and staying inadequate in regulating the current realities of space activities. The absence of regulations on ASAT testing creates loopholes that hinder its ability to comprehensively address these emerging threats.

The gray area lies in determining whether a technology is used for defense or offense, making regulation a complex issue. What seems purely civilian today, like Earth observation satellites, could hold unforeseen military potential in the future. Furthermore, even existing civilian technologies can be repurposed for military applications. Unencrypted communication transmitted through civilian satellites, for example, can be intercepted for intelligence gathering. Overall, when one state develops ASAT capabilities under the pretext of defense, it can trigger a reciprocal response from other states perceiving a threat. This can initiate an arms race in space, with each state vying to surpass the others in ASAT capabilities. This escalation can destabilize the space environment and heighten the risk of conflict.

3.3. International Telecommunication Union

As a specialized agency of the United Nations, ITU plays a crucial role in its primary focus is on promoting international cooperation and establishing technical standards for the efficient and equitable use of information and communication technologies (ICTs). In 1932, the organization transitioned from the International Telegraph Union to the broader International Telecommunication Union. The ITU became a specialized agency within the United Nations in 1947. During the 1980s and 1990s, the ITU was instrumental in establishing global standards for both mobile communications and the internet. Although not explicitly addressing weapons control, the ITU Constitution and Convention include provisions that implicitly support the peaceful use of ICTs. For example, Article 1 promotes international cooperation for the improvement and rational use of telecommunications and Article 33 encourages using telecommunications to enhance international relations and collaboration in ITU constitution and convention.

In order to guarantee the peaceful utilization of ICTs, Article 33 of the ITU agreement mandates that member states must acknowledge the public's entitlement to utilize international communication services for correspondence through the global network of communication. The services, fees, and protections should be uniform for all users within each level of communication without any favoritism or precedence. While these provisions don't directly regulate weapons, they did highlight the ITU's dedication to the peaceful and cooperative use of technology. ITU did decides to address radiocommunications, and cybersecurity through its ITU-BR (ITU Radiocommunication Bureau). Harmful interference, as defined in the ITU Constitution and Radio Regulations, is any disruption to radio communication services that jeopardizes safety services like radio navigation, or severely impairs, obstructs, or repeatedly interrupts authorized radio services. This can occur due to

various reasons, whether accidental or deliberate, and can negatively impact both commercial and essential safety communications.

While almost all countries utilize satellite services in some capacity, no countries that completely abstain from using them. Even countries without their satellite infrastructure often lease capacity from other nations or international providers to access services like internet, television broadcasting, and navigation. Currently there are 67 Countries counted and included, and some more include organizations. Therefore, as nearly every country relies on satellites for essential functions, it is impossible to ignore the escalating and alarming lack of limitations on ASAT weapons. Even if ITU has raised awareness and engage discussions about the dangerous effect of ASAT but it is less meaningful without the International Space Law instrument. It needs more concrete steps or renewing their substances towards prevention. It is devastating to see what the consequences are when the world faces the result of a failed prevention to translate it into action, and ASAT development remains unchecked. The potential for catastrophic disruption to communication, navigation, and other vital services cannot be overstated.

Even though ITU plays a crucial role in ensuring the efficient functioning of satellite communication, its current mandate and capabilities are still insufficient to address the growing threats to satellite security as they are not able to address the prevention of the use of ASAT. The efficiency of the ITU's primary mandate focuses on technical and operational aspects of telecommunications. Its authority does not explicitly extend to security issues like cyberattacks, jamming, or physical attacks on satellites. This restricts its ability to develop and enforce comprehensive security regulations. ITU regulations regarding licensing of satellite systems fall under the authority of individual ITU member states. Each state grants licenses to its own satellite operators and is responsible for ensuring compliance with the Radio Regulations, any bilateral agreements, and domestic regulations. Member States can create their own rules for satellite licensing as long as they do not conflict with their international obligations under the Radio Regulations.

The ITU ensures that each state's satellite operators follow the rules and conditions contained in the Radio Regulations through a multi-faceted approach. Firstly, ITU-RR as an international treaty, that is legally binding for ITU member states. This means that member states are obligated under international law to adhere to these regulations. The ITU member states are responsible for licensing and regulating their own satellite operators in which they should refer to the provision of national licensing in the ITU-RR, including technical parameters like frequency assignments and orbital positions, as well as operational requirements. Secondly, The ITU also facilitates international coordination and notification procedures for satellite systems. This process ensures that proposed satellite systems do not interfere with existing ones and adhere to the Radio Regulations. It involves notifying the ITU and other administrations of planned systems and resolving any potential conflicts through coordination. Article 11 of the Radio Regulations specifically details the notification and recording procedures for frequency assignments. Article 9 addresses the coordination procedures aimed at preventing harmful interference between different radiocommunication systems.

ITU as the specialized agency of the United Nations responsible for information and communication technologies, and the Outer Space Treaty, the foundational framework for international space law, have complementary roles in safeguarding the global community and nations from the adverse impacts of space activities. While the ITU primarily focuses on regulating the use of radio frequencies and ensuring the efficient operation of satellite communication systems, the Outer Space Treaty establishes broader principles for the

peaceful exploration and use of outer space. By ensuring that satellite communications operate without interference, the ITU helps to maintain the integrity of critical infrastructure that supports numerous essential services, such as navigation, weather forecasting, disaster response, and scientific research. This, in turn, helps to protect people and nations from the potential loss of data, cyberattacks, and other disruptions that could result from the misuse or malfunction of satellite systems. Furthermore, the ITU's efforts to promote international cooperation and coordination in the use of radio frequencies align with the Outer Space Treaty's principles of cooperation and mutual assistance in space activities (Jones, 2016). By working together to manage the radio frequency spectrum, nations can avoid conflicts and ensure that space-based technologies are used for the benefit of all humankind.

3.4. Definition of Threats

As space activities have evolved, so too has the understanding of potential threats in this domain. The OST, established during the cold war, reflects concerns of the WMD. According to Article IV of the Outer Space Treaty, signatory nations commit to avoiding the placement of nuclear weapons or other weapons of mass destruction in Earth's orbit, on celestial bodies, or anywhere else in outer space. The treaty's appendix references UN General Assembly Resolution 1884 (XVII) from October 17, 1963, which was unanimously passed and urged countries to abstain from putting nuclear weapons or other weapons of mass destruction into Earth's orbit or installing them on celestial bodies.

In 1977, the UN General Assembly Resolution A/RES/32/84-B defined WMDs are a category of weapons characterized by their immense destructive potential. These weapons are capable of causing widespread devastation, including the mass killing of civilians, severe environmental damage, and long-lasting consequences for future generations. WMDs encompass a range of weapon types, each with distinct mechanisms of harm which are nuclear weapon, Chemical weapon, biological weapon and delivery systems. First nuclear weapons: These devices utilize nuclear reactions to generate explosive force, producing catastrophic effects in a single instance. Chemical weapons: These weapons employ toxic chemicals to cause death or serious injury, often through inhalation, ingestion, or skin contact. Biological weapons: These weapons utilize harmful biological agents or toxins to spread disease, targeting humans, animals, or plants. Last but not least, delivery systems: These include various mechanisms, such as missiles or aircraft, designed to transport and deploy WMDs for hostile purposes or in armed conflict.

Despite the OST's emphasis on peaceful uses of outer space and the ITU's focus on preventing harmful interference, neither instrument provides comprehensive measures for mitigating ASAT. The OST lacks specific provisions on the classification of ASAT, how it was supposing to be elaborated in specifications of ASAT and not leaving gaps of possibility for more ASATs or ASAT damages, while the ITU's regulations primarily focus on frequency allocation and interference prevention rather than ASAT specification. This regulatory gap leaves a significant vulnerability in the space environment, threatening the long-term sustainability of space activities and the benefits they provide to the nations, to the humanity. One could further examine the potential of a specific treaty regarding the ASAT, Given the multifaceted threats posed by ASATs, operational methods (ground-launched, space-based), and targeting capabilities (destruction, disabling, data manipulation), a more comprehensive definition is essential. The Outer Space Treaty's focus on "weapons of mass destruction" primarily addresses nuclear, biological, and chemical threats with direct physical harm to nations. A dedicated ASAT treaty should encompass the broader spectrum of threats, including privacy violations, economic disruption and space debris.

Therefore, a new treaty should establish clear and specific criteria for justifying the use of ASATs, taking into account the wide range of potential consequences (Ouda, 2015). These consequences encompass not just direct physical harm as envisioned by the OST, but also the broader implications for privacy, security, and the long-term sustainability of the space environment. By taking these proactive steps, the international community can foster a more secure and sustainable space environment, ensuring that the benefits of space technology remain accessible to all without the looming threat of ASAT weapons. Failure to address the escalating risks posed by ASATs could lead to a future where space becomes a contested and hazardous domain, riddled with debris and fraught with the potential for conflict. The consequences of inaction are dire, as the destruction or disruption of satellites could cripple critical infrastructure, jeopardize national security, and impede scientific progress. One has a collective responsibility to preserve space for peaceful purposes and ensure that future generations can continue to benefit from its vast potential. By prioritizing international cooperation, strengthening legal frameworks, and investing in debris mitigation, we can chart a course towards a more secure and sustainable future in space. The choice is in, one can either act decisively to protect this invaluable resource or risk a cascade of destruction that could leave us stranded on a planet with limited access to the vast benefits that space offers.

4. Conclusion

The increasing reliance on space-based infrastructure for communication, navigation, and other critical services has made the protection of satellites a paramount concern. The existing legal framework, primarily the Outer Space Treaty and the ITU Radio Regulations, while valuable, falls short in comprehensively addressing the multifaceted threats posed by anti-satellite (ASAT) weapons. The lack of a clear definition of ASATs, the ambiguity surrounding “peaceful purposes”, and the absence of specific regulations on ASAT testing and deployment have created loopholes that undermine the effectiveness of these instruments. The potential consequences of ASAT use, including the generation of space debris, disruption of essential services, and escalation of conflict, underscore the urgency for a dedicated international treaty on ASAT weapons. Such a treaty should clearly define ASATs, establish strict regulations on their development and use, and provide robust enforcement mechanisms to ensure compliance.

Some suggestions might include: The international community should prioritize the negotiation and adoption of a new international treaty specifically addressing ASAT weapons. This treaty should clearly define ASATs, establish a comprehensive ban on their testing and use, and include robust verification and enforcement mechanisms; The ITU should expand its mandate to include cybersecurity and satellite security, enabling it to play a more active role in preventing and responding to ASAT threats. This could involve developing new technical standards and regulations for satellite protection, as well as enhancing its monitoring and reporting capabilities; States should strengthen cooperation and information sharing on ASAT threats and vulnerabilities. This could involve establishing a dedicated international body to monitor ASAT activities, share information on potential threats, and coordinate responses to incidents; States should adopt transparency and confidence-building measures to reduce the risk of sharing information on space policies and activities, establishing hotlines for communication during crises, and conducting joint exercises to improve space situational awareness.

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