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The Militarization of Outer Space: How Low Orbit Space is Increasingly Becoming a Zone of Military Competition

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Abstract

The evolution of space technology over the past two decades has increasingly transformed Low Earth Orbit (LEO) from an environment guided by the norms of "peaceful use" to an area of military activity. This paper evaluates the gap between international space governance frameworks and advancing space technologies that contribute to militarization. It goes on to argue that technological advancement in the realm of anti-satellite weapons, combined with inadequate regulatory mechanisms, has the potential to trigger a space based arms race. Drawing on secondary data and current satellite capabilities, this paper assesses the risk of space militarization today and proposes a set of policy recommendations to maintain the safety of Low Earth Orbit space.

Keywords: Militarization of outer space, Space weaponization, Low Earth orbit (LEO), Anti-satellite weapons (ASAT), Dual-use satellites, Space security dilemma, Space arms race, Orbital warfare

1. Introduction

The first fifty years of human exploration of space were largely guided by the principle of "peaceful use."[1] Although not formally defined, a general consensus existed that weapons should not be placed in space and states should not target objects in space. In this paper, the militarization of space is generally defined as the enhanced use and placement of military technology or weapons in Earth's orbit and outer space[2]. However, over the last twenty years, the norms surrounding the use of outer space have begun to change, the militarisation of space slowly becoming increasingly normalised. The emergence of this

[1] UNIDIR, United Nations Institute for Disarmament Research, Project Ploughshares Canada, The Simons Centre for Peace and Disarmament Studies, Patricia Lewis, Ernie Regehr, and Jennifer Allen Simons. *Outer Space and Global Security*. United Nations, 2003. https://unidir.org/files/publication/pdfs/outer-space-and-global-security-307.pdf.

[2] EBSCO. "Militarization of Space | Research Starters | EBSCO Research," n.d. https://www.ebsco.com/research-starters/military-history-and-science/militarization-space.

change is the direct result of George W. Bush pulling out of the Anti-Ballistic Missile Treaty (ABM) in 2001 after the attacks of 9/11 – a decision he justified by arguing that the treaty was preventing the United States from adequately protecting itself against terrorists.[3] Following this decision, the Bush Administration began the development of a multilayer missile defense system that incorporated a space-based defense element. Soon after, other states began to follow, undermining the principle of "peaceful use" and making space a new frontier of militarisation.[4]

Modern militaries rely on satellites for communication and navigation, which also assist in guiding missiles. These systems form the backbone of military operations, correlating space with strategic power, thus making the militarisation of outer space an increasingly prevalent issue. Most satellites today operate within low Earth orbit , which encompasses Earth-centered orbits with altitudes of 2,000 kilometers or less. LEO is susceptible to militarisation as this orbit is considered close enough to Earth for convenient transportation and communication.[5]

Although the strategic value of space for militarisation only grows stronger, the same cannot be said for the international frameworks designed to prevent the military use of outer space. Otherwise known as the "Magna Carta" of international space law, the 1967 Outer Space Treaty is the only current international framework that places limits on the use of outer space.[6] However, while it establishes the general principles that lay the foundations for the body of international space law, the practical meaning and implications of the treaty can be unclear. As a result, space law, or "all the law that may govern outer space and activities in and relating to outer space," remains relatively undefined. NATO recently formulated an overarching space policy which recognized space as an operational domain of warfare, as countries have continued to advance their Anti-Satellite (ASAT) weapon capabilities. However it is incredibly difficult to create a comprehensive policy that efficiently regulates all military activities in space because weapons are not limited to just orbital ASAT weapons and missiles, but can also take the form of cyberattacks. As nations continue to rely heavily on satellites for defense, the incentives to disable other nations' satellites using ASAT weapons also increases. This leads to a positive feedback loop of competition, inciting a space security dilemma, which if not regulated, could cause long term degradation of the orbital environment due to the mass amounts of debris generated by ASAT tests.

Furthermore, The 1967 Outer Space Treaty prohibits the placement of weapons of mass destruction in orbit but does not address conventional space weapons. Thus,

[3] "View of a Farewell to New-START? Strategic Arms Control Under Pressure Amid War in Ukraine | Global Biosecurity," n.d. https://jglobalbiosecurity.com/index.php/up-j-gb/article/view/206/491.

[4] UNIDIR, Project Ploughshares Canada, *Outer Space and Global Security*, 2003.

[5] Guzman, Ana. "Commercial Space Frequently Asked Questions - NASA." *NASA* (blog), August 15, 2025. https://www.nasa.gov/humans-in-space/leo-economy-frequently-asked-questions/#:~:text=Low%20Earth%20orbit%20encompasses%20Earth,communication%2C%20observation%2C%20and%20resupply.

[6] Peperkamp, Lonneke. "An Arms Race in Outer Space?" *Atlantisch Perspectief*, vol. 44, no. 4, 2020, pp. 46–50. *JSTOR*, www.jstor.org/stable/48600572.

without any new international norms, outer space could become an area of greater militarisation and rivalry. This gap between regulations and practice could prove to become dangerous, potentially leading to a modern arms race–this time in the frontier of space.

This paper will focus on the gap that exists within practice and policy, addressing the question: *To what extent is the growing militarisation of outer space increasing the risk of an arms race in low Earth orbit, and how can international frameworks adapt to prevent the weaponization of space?* Through a descriptive, explanatory, and exploratory analysis, the paper will utilize case studies, secondary data analysis, satellite imagery verification, and an international policy and law review to provide policy guidance as to how to prevent the long term weaponization and degradation of space.

2. Descriptive Analysis: The Current Landscape of Space Capabilities

2.1. Mapping Existing Space and Military Assets

As space becomes increasingly militarized, the pressure for states to keep up with evolving space technology continues to increase as well. As a result, states are investing more money in these technologies. For example, in 2025, NASA's fiscal year budget is projected to reach an all-time high of 27 billion dollars, exemplifying the growing strategic interest in space capabilities.[7] This section of the paper aims to map out the existing space and military assets capabilities in order to illustrate the scale of technology that is at stake in Earth's Low Orbit.

Satellites are indispensable in the modern world for multiple uses, including communication, navigation, intelligence, and surveillance. In the context of warfare, satellites allow states to utilize precision targeting and early attack warning information, both of which can be used as deterrence strategies.

Missile defense systems are one of the many ways space technology is used to defend a state. After the Defense Support program (DSP), the Space Infrared System (SBIRS) has become vital to international security. These defense systems aim to detect missiles early and act as a defense against nuclear-armed intercontinental ballistic missiles (ICBMS). Currently, China, France, India, Iran, Israel, Italy, Russia, Taiwan, the United Kingdom, and the United States have developed such nuclear missile defense systems.

The Soviet Union's launch of the first satellite, Sputnik 1, in 1957 set off a ripple effect for other states to catch up.[8] Over time, this grew a state reliance on satellites. At the same time, as the need for satellites increased, states responded by targeting satellites using Anti-Satellite Weapons (ASATs). Within ASATs, there are two types of weapon capabilities, kinetic and non-kinetic. Kinetic ASATs include missiles, drones, and other satellites that physically crash into the targeted satellite. On the other

[7] Eric Lemay. "Space as the New Frontier: Military Applications and Strategies." *Cevians*, February 3, 2025. https://www.cevians.com/space-as-the-new-frontier-military-applications-and-strategies/.

[8] Mark Smith. "Anti-satellite Weapons: History, Types and Purpose." *Space*, August 10, 2022. https://www.space.com/anti-satellite-weapons-asats.

hand, non-kinetic ASATs use nonphysical ways of disrupting satellites, including cyber attacks, electromagnetic pulses, and lasers. This makes it difficult to provide a clear definition to ASATs, as they are considered as any technology that can damage a satellite, both physically and non-physically.[9] This poses an issue when defining "benign technology" such as Active Debris Removal technology (ADR) which aims to remove space debris but can also remove active satellites. Thus, a new category of ASATs has emerged, known as "dual-use" space infrastructure, which makes distinguishing between a weapon and nonweapon more difficult. Consequently, the use of ASATs can increase "space junk" or debris in low Earth orbit, deteriorating the space environment and causing accidental damage to spacecraft, a phenomenon known as Kessler Syndrome[10]. As a result, the United States, Russia, China, and India all have developed ASATs but have not yet deployed them for warfare. After nuclear disarmament talks began to progress, a movement towards eliminating the use of ASATs has gained momentum as well.

Similar to ASATs, space military technology does not only consist of physical weapons and satellites, but can also take the form of cyber warfare. Cyberattacks occur when perpetrators gain access to a target's computer system and then hack in-orbit satellites, leaking data, or changing the target's computer system. In recent years, cybersecurity has become increasingly important in the space sphere, with the *2020 White House's National Space Policy* emphasizing the value of integrating cybersecurity into space operations to obtain positive control of spacecraft.[11]

Finally, the orbital dominance and strategic positioning of satellites can be strategically used as a form of militarisation strategy. Satellites that follow geostationary orbit (GEO), rotate west to east over the equator at the same velocity as Earth's rotation.[12] Satellites following GEO allow state defense teams to follow missile launches and nuclear detonations from other countries. These satellites usually also operate in LEO, and can receive information from other satellites to obtain communication.

2.2. Chronological Evolution of Space Militarisation

Starting during the Cold War, states began placing a greater emphasis on developing space technology. Following the space race, the space frontier has become a new domain of warfare with more and more states increasing their strategic investment in it. With this evolution, a greater need for international diplomacy around space emerged. However, the speed at which this diplomacy has progressed fails to match the speed that space military technologies have advanced.

The first legal principles governing Outer Space were adopted by the UN General Assembly in 1963, as UN

[9] Talia Blatt. "Anti-Satellite Weapons and the Emerging Space Arms Race." *Harvard International Review*, August 31, 2020.
[10] Smith, "Anti-Satellite Weapons: History, Types and Purpose," August 10, 2022.
[11] Trump and Eisenhower, "NATIONAL SPACE POLICY of the UNITED STATES OF AMERICA."
[12] Lemay, "Space as the New Frontier: Military Applications and Strategies," February 3, 2025.

Resolution (XVII), titled "Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space."[13] This declaration created the foundational legal framework that would later be incorporated into the 1967 Outer Space Treaty. Specifically, it outlined that outer space is free for exploration by all states on the basis of equality, that it cannot be claimed by any state, and that space must be used for peaceful purposes and for the benefit of all humankind. The treaty also made states responsible for national activities in space and liable for any damage caused by their space objects to other states or their citizens. Further, in this framework, states must avoid the contamination of space and celestial bodies, give due regard to the interests of others to promote international cooperation, and assist all astronauts in case of distress or in the case of emergency landings. This first declaration helped set out the basic legal and ethical framework for space exploration.

After the adoption of UN Resolution XVII, the first international treaty on outer space opened for signature in 1967. This international treaty, known as the "Outer Space Treaty" and sometimes referred to as the "Constitution of Space Law", officially prohibits national sovereignty claims, bans weapons of mass destruction in orbit, and makes states responsible for all space activities.[14] Solidifying the goals outlined in the earlier UN declaration, it also officially defined outer space as a place that should be utilized for peaceful purposes. The treaty marked a milestone in space diplomacy, as it was signed by both the US and the USSR during the Cold War..[15]

Following the 1967 Outer Space Treaty, the 1968 Rescue Agreement consolidated the principle of rescuing and assisting astronauts in distress and returning them safely to their country of origin.[16] The 1972 Liability Convention[17] went on to define the rules for damage and compensation caused by space objects and the 1975 Registration Convention[18] required states to register all space objects launched into orbit.

These initial resolutions, conventions, and treaties outlined the birth of space law in the 1960s. The 1970s then commenced a new period of space law which expanded cooperation between actors who were in contention during the Cold War period. This new era of cooperation was marked by the 1975 Apollo-Soyuz Test Project[19], the first joint US-Soviet joint mission. Then in 1984, the commercialization of space began with the Commercial Space Launch Act,[20] which commenced a shift towards private cooperation in space ventures. This trend continued into the 1990s and 2000s, with the 1998 International Space Station Agreement which joined together 15 countries, including the US, Russia, Japan,

[13] Yukiko Okumura, "Space Law: Resolutions."
[14] Mark Smith. "Anti-satellite Weapons: History, Types and Purpose." *Space*, August 10, 2022. https://www.space.com/anti-satellite-weapons-asats.
[15] Robert Wickramatunga, "The Outer Space Treaty."
[16] Robert Wickramatunga, "Rescue Agreement."
[17] Robert Wickramatunga, "Liability Convention."
[18] Robert Wickramatunga, "Registration Convention."
[19] NASA, "Apollo-Soyuz Test Project - NASA."
[20] "H.R.2262 - 114th Congress (2015-2016): U.S. Commercial Space Launch Competitiveness Act."

Canada, and other European nations to jointly construct and operate the ISS.[21] Following the ISS's creation, the 2000s led to an emergence of new space powers, in particular China and India, which launched their own space programmes. This began a diplomatic discussion shift towards more inclusive governance and the aim of preventing an arms race in outer space (otherwise known as PAROS).

Over the last ten years, a new era of international space diplomacy has emerged, centred around private commercialization and security concerns. In 2015, the United States Congress passed the U.S. Commercial Space Launch Competitiveness Act, which recognised the private ownership of space resources. This decision was contested by other international actors who argued that this was not legal under the 1967 Outer Space Treaty which declares that states cannot claim space as their own. Nonetheless, the passage of this law established the norm for the privatization of outer space, a precedent which still exists today.

Further, in 2019, NATO established the NATO Space Centre, and formally recognized space as an operational domain along air, land, maritime, and cyberspace.[22] At this point, conversation shifted from a race to develop the newest technology to growing concerns about security in outer space. Following the emphasis on space in international security, the United States developed the U.S. Space Force[23] in 2019, Russia developed the Russian Aerospace Forces in 2015,[24] China established the People's Liberation Army Strategic Support Force[25] in 2015, France established the Commandment de l'Espace (or Space Command) in 2019, and many other states did the same, understanding the underscored importance of space as the future of war.[26]

Fears over the security of outer space have continued to grow, as requests to the UN to put declarations in place to prevent an arms race in outer space have exponentially increased. Furthermore, the added dimension of space debris management and the effects on the space environments when ASATs are activated have only furthered the call to update international frameworks around outer space to be more specific.

3. Explanatory Analysis: Why States Pursue Space Militarisation

However, in order to understand the future implications of space militarisation, it is important to recognize that the militarisation of space is not merely technological, but is also deeply embedded in other factors such as national strategy and institutional interests. This section of the paper aims to provide an explanatory analysis as to why states pursue militarisation in the first place.

[21] UNITED STATES OF AMERICA et al., "SPACE STATION."
[22] "NATO Space Domain, a New Frontier of Security."
[23] Space Force, "Space Domain."
[24] Myers and War vs Peace Foundation, "THE RUSSIAN AEROSPACE FORCE."
[25] "China's New Information Support Force."
[26] Elysee, "Inauguration Du Commandement De L'espace À Toulouse."

3.1. Strategic and Military Rationale Through Deterrence

In modern warfare, space is considered the "ultimate high ground".[27] Significant surveillance and targeting can be accomplished through satellite use. In this manner, developing and holding advanced space technology acts as deterrence or as a strategic stabilizer itself.[28] Essentially, if a state has advanced space capabilities (say for example ASATs), other states will be less likely to attack or show aggression to the state with space capabilities because they are aware of the consequences of disrupting a state who holds this type of technology. Specifically, the US "Space Control" doctrine emphasizes how freedom of operation in space (as outlined by the 1967 Outer Space Treaty) is critical to establish deterrence credibility.[29] The doctrine outlines military spacepower as the ability to accomplish military objectives from the space domain. Further, space superiority is the degree of control that allows forces to operate without interference from space or counterspace threats. However, up until now, since the evolution of nuclear weapons, most competition between superpowers has not reached the threshold of direct hostilities. If a threshold of direct hostility was to be reached, space would be one of the main domains in which this hostility would be exercised.

In particular, ASAT testing is one of the largest political messages of space capability and intent. These tests allow for a dual purpose: validating internal technology for the country as well as performing external deterrence signalling. A prime example of this deterrence is China's 2007 ASAT Test.[30] In January of 2007, China destroyed one of its own satellites, the Fengyun-1C satellite, leading to fears that a space arms race was on the way yet again.[31] In the months following, China affirmed that they had no plans to continue such practices, but the test itself already demonstrated to the international order that China's space program had advanced. By showing the rest of the world that they are capable of using an ASAT weapon, China displayed its military strength to the rest of the world. This performance of military capacity was particularly relevant to one of their biggest rivals, the United States, as it showed them that China had the capacity to destroy the satellites that it heavily relied on for everyday activities. This test had an immediate effect on the international order in the rest of the world. Japan, a longtime rival of China, immediately charged Beijing with violating the United Nations' 1967 Outer Space Treaty, which banned the use of mass destruction in space. Similarly, India, who also is a rival of China, announced intentions of setting up a new aerospace command a mere two weeks after China's 2007 ASAT test, demonstrating the vast power of holding advanced outer space capabilities on the international hierarchy.

3.2. Political and Institutional Drivers

However, the role of space achievements extends beyond military strategy and the creation of a more threatening state. They also act as a way of propelling

[27] Meyer and Stallings, "Is Space the Ultimate High Ground?"
[28] Rice, "Deterrence and Space Strategy."

[29] Space Training and Readiness Command (STARCOM), STARCOM Delta 10, and SALTZMAN, Space Force Doctrine Document – 1 (SFDD-1), the Space Force.

[30] Zissis, "China's Anti-Satellite Test."
[31] Zissis, "China's Anti-Satellite Test."

nationalism and national prestige, which can consequently be used to establish political legitimacy.[32] In today's political context, space achievements are a symbol of modernity and leadership in global politics. On the domestic scale, governments can also use space successes to establish domestic legitimacy.

A prime example of space militarisation used as a political tool is India's Mission Shakti in 2019. On March 27, 2019, Prime Minister Narendra Modi announced in a nationally televised address that India had conducted an anti-satellite (ASAT) test.[33] In this mission, the Prithvi Delivery Vehicle March-II, a kinetic ASAT, physically struck down an Indian Microstat-R satellite. Following China's 2007 ASAT test, this launch was a huge success for India, solidifying the country on the global stage with high technological space capabilities.[34] This led to uproar on the international level, but opposition Modi also argued that this was a political move aimed at strengthening national pride before the Indian national elections. Following Prime Minister Modi's speech, Modi's opposition questioned the timing of the announcement, as the election period for the Lok Sabha was active during the time of the announcement.[35] The opposition went on to argue that the timing of this militarisation was a way to incite national pride and divert attention from other issues on the ground. The timing of this launch allowed for Indian nationalism to flourish before the Lok Sabha elections, a political move that had significant domestic and symbolic ramifications.

In the global arena, Modi continued to affirm that this test was not a form of aggression on the international stage nor an intention to weaponize space, but rather a form of "credible deterrence".[36] Rather than the effect of the technology itself, India's ASAT test strengthened its power in future space order, making them a responsible actor for the future. Thus, the mission did not only have technological goals but also goals to uphold symbolic power, an important consideration to be made when considering why states test advanced space military technology.

3.3. Technological and Economic Dual Catalysis

While the motivation behind expanding space military technologies does have genuine foundations in states domestic and international desires, it is also imperative to note the dual evolution of space technology that is used in militarisation with the commercial space sector. After the United States passed the Commercial Space Launch Act in 1984, private cooperation in space exploration slowly became the new norm, otherwise referred to as "new space." Specifically, the launch of SpaceX by Elon Musk in 2002 sped up the turn towards privatization.[37] Now, private players tend to contribute to landmark innovations

[32] "Space Militarism: A Debate – Science for the People Archives."
[33] Tellis, "India's ASAT Test: An Incomplete Success."
[34] Tellis, "India's ASAT Test: An Incomplete Success."
[35] Sagar, "How Political Slugfest Over Mission Shakti Overshadowed Its Success."
[36] "Frequently Asked Questions on Mission Shakti, India's Anti-Satellite Missile Test Conducted on 27 March, 2019."
[37] "Brève Stratégique N°54 - 2023 - SpaceX, 20 Ans De Révolution Spatiale - IRSEM."

of space technology, changing the balance of power in space.[38] This development brought about the expansion of satellite manufacturing by commercial actors such as Axar and BlackSky. These private companies are largely funded by venture capital and investments into new space, and motivated by profits, have incentives to continue advancing space technologies.

For example, private companies have facilitated the development of reusable rockets, which significantly decrease the cost of transportation to space, making space more accessible.[39] While traditional rockets can only be used once and then must be discarded, reusable rockets allow for the same rocket to be relaunched and refurbished, significantly increasing the speed of space advancements. Similarly, the miniaturization of materials and autonomous onboard practice has enabled private companies to create more efficient technology faster. In this system, governments can instead purchase commercial services made by the private companies, creating public-private mixed ecosystems. However, as government defense agencies are increasingly reliant on commercial partners, the regulatory frameworks that are supposed to manage these relationships are not able to keep up, leading to a complex interdependence between defense companies and government policies.[40]

Commercialization also drives lower costs of sending technology into orbit, as it decreases the previously significant launch costs.. NASA's Space Shuttle had a cost of $1.5 billion ($54,500/kg launched), while Space X's Falcon 9 only cost $62 million ($2,720/kg launched).[41] This new launch cost makes space support much cheaper than before, which allows companies to innovate faster, launch more satellites and thus earn more money. Having an increased number of satellites means a higher capacity for ISR, known as intelligence, surveillance, reconnaissance, allowing states to obtain high levels of information.

However, the increase of satellites for commercial purposes also provides an intrinsic dual use. For example earth observation imagery, which is not traditionally used for military purposes, was used to capture images of Russian military build up near the Ukraine border, making the line between weaponization and commercial use increasingly blurred.[42] This in turn creates a feedback loop, as increased commercialization indirectly leads to increased space militarisation, which causes more investment from venture capital, which then funds more commercialization. There is little accountability because all of the development occurs in the private sector, and defense reliance motivates governments to subsidize and protect key companies.[43] Because satellites even in dual use can be interpreted as

[38] IHEDN - Institut des Hautes Etudes de Défense Nationale, "« New Space » : Les Défis Stratégiques De La Privatisation De L'espace."
[39] Globalaero_Admin, "How Fully Reusable Rockets Are Transforming Spaceflight."
[40] Maye, "Autarky or Interdependence: U.S. Vs. European Security and Defense Industries in a Globalized Market."
[41] Jones and NASA Ames Research Center, "The Impact of Lower Launch Cost on Space Life Support."
[42] "Ukraine Photo Story."
[43] Roulette, Bryan-Low, and Balmforth, "Musk Ordered Shutdown of Starlink Satellite Service as Ukraine Retook Territory From Russia."

offensive, this causes states to respond and try to advance their technologies at a faster rate, thus causing a security dilemma and for the norms of the peaceful use of space to become eroded.

4. Exploratory Analysis: Future Trajectory of Space Security & Policy Recommendations

Regardless of whether militarisation should exist or not, states have to either develop their own technology or get left behind in the international order. At this point, with the commercialization of space, the chances of leaving militarisation behind are slim to none. However, in academia, there are varying opinions as to what degree the future of space militarisation is to come.

4.1. Prospects for a Space Arms Race in LEO

Among the realm of international space law, there is growing concern regarding the short-livedness of the norm of peaceful use. Following the increased launch frequency of dual-use satellites by a growing number of countries and the lack of international law limiting weaponization, fears of a nuclear war carried out through space technology continue to grow. Currently, roughly three out of four satellites in low Earth orbit are military, even if they do not all necessarily employ direct weapons[44]. Thus, trend indicators, such as launch frequency, spending data, and ASAT testing patterns show that a space, if not adequately regulated, is a new vital domain of war.

5. Policy Recommendations

This analysis has clearly outlined the existing gap between the speed at which space military technology is advancing and the promulgation of updated international frameworks regulating the use of space in an increasingly militarized world.

5.1. Verification Mechanisms

A measure that could be implemented to prevent escalation to a space arms race is a stronger verification mechanism that enforces a satellite imagery based transparency regime.

Incorporating frameworks in other operational areas, such as airspace, can be used to find a realistic implementation of a verification mechanism. For example, the 1992 Open Skies Treaty created co-operative aerial-observation obligations to build confidence and familiarity among states regarding flight capabilities.[45] In the context of space, similar mechanisms could be put into place that require states to provide verifiable information about future satellite launches and tests. These obligatory mechanisms could be an effective way of ensuring that space capabilities don't advance past the point of peaceful cooperation.

Moreover, alongside developed verification mechanisms, this analysis has shown that international norms that advocate against anti-satellite (ASAT) testing should be institutionalized. Allowing the free use of anti-satellite space weapons poses a risk not only regarding

[44] Din, "Stopping the Arms Race in Outer Space."

[45] States Parties, "TREATY ON OPEN SKIES."

the creation of offensive military strategies, but also the debris generated from the tests can last indefinitely, posing a threat for the space environment. Specifically, international agreements should implement bans on kinetic ASAT tests while providing alternatives for non-destructive methods of defense testing.

5.2. Debris Mitigation Measures

To assist the prevention of excess space debris in the outer space environment, there should be international norms that mandate states' sharing of space situational awareness data (SSA).[46] Space situational awareness databases collect and store information about the different events and objects in Earth's orbit by tracking satellites and other space objects. If states and other private commercial actors are required to share real time situational awareness data, it would assist to prevent accidental collisions in space that could potentially have adverse effects on the space environment.

5.3. Formalization of Dual Use Governance + Commercial Actor Regulation

As outlined above, most space technology today holds both military and civilian purposes. Because the distinction between military and civilization policy has become increasingly blurred, future international frameworks should drive governance that specifically dictates dual-use technologies. Otherwise, without global regulatory standards, commercial actors may inadvertently contribute to further space militarisation.

5.4. Confidence Building Measures Between Major Powers

Finally, in order to effectively implement the mechanism mentioned through these policy recommendations, it is important to implement bilateral and multilateral confidence building mechanisms. Measures such as joint space exercise and debris removal operations could help to create continuous cooperation between international states. Specifically, initiatives such as the European Space Agency's Clean Space program, which binds together multiple states to help and prevent the accumulation of debris in space, demonstrate how confidence building mechanisms can both enforce operational norms and build trust in the international community.[47]

6. Conclusion

The militarisation of space has advanced to the point where technological acceleration has outpaced the regulatory frameworks that were meant to define it. The window for preventative policy remains open, and thus it requires swift action and policy frameworks that operationalise space as a peaceful domain. The decisions implemented by international actors now will determine how long space remains a shared and peaceful domain. To prevent potential destabilizing orbital conditions, an increasing priority should be given to creating verifying mechanisms, establishing norms against ASAT testing, promulgating debris mitigation operations, regulating commercial actors, and creating cooperation-based mechanisms between the major international powers

[46] "SSA," EU Agency for the Space Programme, n.d.

[47] European Space Agency,"The Challenge."

today. If implemented, these steps could potentially prevent military escalation in outer space.

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