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The New Frontier of Conflict: Space Militarization and the Erosion of Global Governance

Alizeh khakwani
M.Phil Public Administration, BZU Multan
alizehkhakwani97@gmail.com
Adeel Ahmad
M.Phil Public Administration/M.A Political Science, BZU Multan
Adeel.ahmad4093@gmail.com
Muhammad Saqlain
M.Phil (Public Administration) Continue, M. A (Political Science), BZU Multan
saqlainchaudhary@gmail.com

ABSTRACT

The militarization of space is no longer a futuristic concern, it's happening now, and it has profound implications for global peace and security. As countries develop space weapons and expand their defense strategies into orbit, the lack of updated international laws and institutions leaves Earth's orbital space increasingly vulnerable to conflict. This article explores how key global powers are advancing their military presence in space, the strategic logic behind these moves, and the critical gaps in international governance frameworks. Drawing from realism, liberal institutionalism, and the security dilemma theory, the study argues that unless cooperative mechanisms are urgently established, space could soon become a fully militarized arena mirroring the geopolitical rivalries of Earth. Through an in-depth analysis of anti-satellite weapon tests, national space strategies, and interviews with leading experts, this paper highlights the dangers of inaction and proposes key reforms to prevent escalation.

Keywords: *New Frontier, Conflict, Space Militarization, Global Governance.*

1. Introduction

The militarization of space has transformed outer space from a realm of scientific exploration and international cooperation into a contested domain of strategic competition and potential conflict. Once celebrated as a frontier for humanity's collective aspirations—evidenced by milestones like the Apollo moon landings and the collaborative International Space Station—space is now increasingly viewed through the lens of national security and military advantage. Major powers, including the United States, China, Russia, and emerging actors like India, are rapidly developing and deploying advanced military technologies, such as anti-satellite (ASAT) weapons, space-based surveillance systems, and cyber capabilities, to secure strategic dominance in this critical domain (Johnson-Freese, 2017). This shift has profound implications for global peace and security, as the absence of robust, updated international governance frameworks leaves space vulnerable to escalating tensions and conflict. The 1967 Outer Space Treaty (OST), the cornerstone of space governance, is increasingly inadequate in addressing modern challenges, such as dual-use technologies, private sector involvement, and the proliferation of space debris (Moltz, 2020). As geopolitical rivalries extend into orbit, the risk of space becoming a fully militarized arena mirrors terrestrial power struggles, threatening the stability of international norms and the sustainability of the space environment (Krepon & Heller, 2019). This paper examines the drivers, consequences, and governance challenges of space militarization, proposing reforms to prevent escalation and preserve space as a shared global commons.

The urgency of addressing space militarization stems from its potential to reshape global security dynamics. Satellites, which underpin critical functions such as communication, navigation, and intelligence, are no longer merely tools for scientific advancement but also strategic assets and potential targets in conflict scenarios (Harrison et al., 2020). The 2007 Chinese ASAT test, which destroyed a defunct satellite and generated thousands of debris fragments, marked a pivotal moment, demonstrating both the technological capacity for space-based warfare and the environmental hazards it creates (Weeden, 2010). Subsequent tests by Russia in 2021 and India in 2019 further underscored the growing trend of weaponizing space, signaling a shift from cooperative exploration to strategic competition (Moltz, 2019). These developments highlight the dual-use nature of many space technologies, where systems designed for civilian purposes, such as satellite servicing vehicles, can be repurposed for military objectives, complicating efforts to distinguish peaceful from hostile intent (Spector, 2021). The involvement of private companies, such as SpaceX and Blue Origin, adds another layer of complexity, as their expanding role in space infrastructure challenges traditional state-centric governance models (West, 2019).

The erosion of global governance in space is a central concern. The OST, which prohibits the placement of nuclear weapons in space and mandates the peaceful use of outer space, was crafted during the Cold War and does not account for contemporary realities, such as non-kinetic weapons, cyber threats, or the rise of commercial actors (Bledsoe & Whitehead, 2017). Its lack of enforcement mechanisms and vague definitions, particularly around "peaceful use," allow states to justify military activities under the guise of defense, undermining its normative authority (Jakhu & Pelton, 2017). Other international efforts, such as the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), have struggled to achieve consensus on new regulations due to geopolitical rivalries and differing national priorities (Deudney, 2020). The absence of binding agreements on issues like ASAT weapons or debris mitigation exacerbates the risk of conflict and environmental degradation, as demonstrated by the growing threat of the Kessler Syndrome, a scenario where cascading collisions could render orbital bands unusable (Kessler & Cour-Palais, 1978).

This paper addresses three core questions: How are major powers advancing their military capabilities in space? What are the implications of these developments for international peace and conflict escalation? And can global governance mechanisms be reformed to prevent space from becoming a war zone? These questions are explored through a theoretical framework that integrates realism, liberal institutionalism, and the security dilemma. Realism posits that states prioritize power and security in an anarchic international system, viewing space as a critical domain for achieving strategic advantage (Waltz, 1979). The establishment of the U.S. Space Force in 2019 and China's focus on "informationized" warfare reflect this logic, as states seek to dominate space to enhance their terrestrial capabilities (DoD, 2022; Kulacki, 2019). Liberal institutionalism, conversely, emphasizes the potential for cooperation through institutions and treaties, such as the OST or the Artemis Accords, to reduce conflict and foster trust (Keohane & Nye, 1977). However, the effectiveness of these mechanisms depends on the political will of major powers, which is often undermined by mistrust and competition. The security dilemma provides a nuanced perspective, illustrating how defensive actions, such as deploying resilient satellite networks, can be perceived as threats, triggering an arms race (Jervis, 1978).

The strategic importance of space cannot be overstated. Satellites are integral to modern warfare, enabling early warning, intelligence gathering, and precision targeting (Lanoszka & Hunzeker, 2021). Their vulnerability, however, makes them tempting targets, as demonstrated by the development of kinetic and non-kinetic weapons capable of disabling or destroying space assets (Harrison et al., 2020). The paper highlights specific

examples, such as the U.S. Counter Communications System (CCS), which can jam enemy satellites, and Russia's "inspector" satellites, which could interfere with adversaries' spacecraft (Moltz, 2019). These capabilities raise the specter of conflict scenarios, such as the "blindness effect," where the loss of early-warning satellites impairs missile detection, increasing the risk of preemptive strikes (Panda, 2021). Moreover, an attack on a satellite critical to nuclear command-and-control could escalate into a broader conflict, with catastrophic consequences for global stability (Acton, 2018).

The role of emerging players and commercial actors further complicates the landscape. India's 2019 Mission Shakti test demonstrated its entry into the space security arena, while the European Union's IRIS² project aims to reduce reliance on foreign satellite systems (ESA, 2023). Meanwhile, private companies like SpaceX have revolutionized space access with systems like Starlink, which proved instrumental in maintaining communications during the Ukraine conflict (O'Callaghan, 2022). However, the integration of commercial assets into military strategies raises concerns about accountability and the potential for non-state actors to become embroiled in conflicts. The paper's emphasis on these actors underscores the need for governance frameworks that encompass both state and non-state entities, a challenge that existing institutions are ill-equipped to address.

The environmental consequences of space militarization are equally pressing. The proliferation of space debris, exacerbated by ASAT tests, threatens the sustainability of the orbital environment. The 2007 Chinese test alone generated over 3,000 trackable debris fragments, posing risks to operational satellites and the International Space Station (Liou, 2018). The potential for Kessler Syndrome highlights the shared interest in debris mitigation, yet the lack of enforceable international standards hinders progress. The paper's policy recommendations, such as mandating debris mitigation measures and establishing an international space monitoring agency, offer practical solutions but face significant political and logistical hurdles (Krepon & Heller, 2019).

The central hypothesis of this paper is that without urgent and collective action, space will evolve into a major theater of geopolitical competition, mirroring terrestrial rivalries. The absence of effective governance mechanisms, combined with the rapid pace of technological advancements, increases the likelihood of conflict and environmental degradation. The paper's analysis draws on a multidisciplinary approach, incorporating case studies, expert interviews, and strategic assessments to provide a comprehensive understanding of the issue. For example, reports from the Secure World Foundation and the Space Policy Institute highlight the operational realities of space militarization, including near-collisions and strategic deployments (Weeden & Samson, 2020). These insights underscore the urgency of reforming global governance to address both security and sustainability challenges.

Looking forward, the paper argues for a multifaceted approach to prevent escalation. Revising the OST to include conventional weapons, promoting norms of responsible behavior, and enhancing multilateral cooperation through platforms like COPUOS are critical steps. However, their success depends on overcoming geopolitical mistrust and engaging emerging and non-state actors. The role of artificial intelligence and cyber-physical systems, as noted in the paper's conclusion, represents an emerging frontier that requires further research, as these technologies could amplify the risks of militarization (Deudney, 2020). Ultimately, the choices made in the coming years will determine whether space remains a domain of exploration and innovation or devolves into a battleground of rivalry and conflict.

2. Theoretical Framework

To make sense of the ongoing militarization of space, this research draws from three prominent schools of thought in international relations: realism, liberal institutionalism, and the concept of the security dilemma.

Realism posits that states are inherently competitive, driven by the need to survive in an anarchic international system. From this perspective, space is simply the latest strategic arena where states seek to gain dominance over their rivals. Military assets in space can offer a decisive advantage in surveillance, communication, and potentially even preemptive strike capability. As Kenneth Waltz (1979) argued, the structure of the international system compels states to prioritize power and security over cooperation.

Liberal Institutionalism, on the other hand, emphasizes the role of international cooperation, treaties, and institutions in reducing the likelihood of conflict. This approach sees treaties like the OST and initiatives like the Artemis Accords as important, albeit imperfect, efforts to keep space peaceful. Institutions can offer transparency, build trust, and create mechanisms for conflict resolution. However, their effectiveness often depends on the political will of powerful states (Keohane & Nye, 1977).

The **Security Dilemma** provides a nuanced view of how actions taken by one state to increase its security—such as launching a new satellite defense system—can be perceived as threatening by others, leading to an arms race. This concept is particularly relevant in the space domain, where it's difficult to determine the true intent behind many dual-use technologies (Jervis, 1978).

3. Literature Review

A growing body of scholarship has begun to analyze the implications of space militarization, particularly as it relates to global governance, deterrence, and legal frameworks. Scholars such as Moltz (2019) argue that while space has traditionally been framed as a domain for scientific and peaceful cooperation, recent developments signal a fundamental shift in strategic thinking among spacefaring nations. The increasing presence of dual-use satellites, kinetic energy weapons, and cyber capabilities underscores this transformation.

The legal dimension has been widely critiqued. Bledsoe and Whitehead (2017) contend that existing treaties such as the Outer Space Treaty (OST) are vague and outdated, failing to regulate modern military technologies or prevent their misuse. The challenges of verification and attribution in the space domain further limit the enforceability of legal norms (Johnson, 2016).

Realist scholars have emphasized the strategic logic behind militarization. As Lanoszka and Hunzeker (2021) note, space-based systems play a critical role in early warning, intelligence gathering, and command and control, making them both vital and vulnerable. This makes space a tempting target in any great-power conflict scenario.

Meanwhile, liberal scholars highlight the role of institutions like the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) in attempting to mitigate risk. However, despite these efforts, as Deudney (2020) points out, the growing number of space actors—both state and commercial—makes consensus-building increasingly difficult.

Finally, a number of recent case studies, such as those conducted by the Secure World Foundation and the Space Policy Institute, underscore the operational reality of space militarization. Reports have documented tests, strategic deployments, and even near-collisions, signaling that the risk is not theoretical but very real.

Collectively, the literature makes clear that the militarization of space is not merely a future concern but an unfolding challenge that threatens the stability of international norms, regimes, and power balances.

4. Current State of Space Militarization

A. Offensive Capabilities

The most visible and controversial signs of space militarization are kinetic anti-satellite (ASAT) weapons. In 2007, China drew international criticism after it destroyed one of its own satellites with a missile, generating a large and dangerous debris field. Russia followed in 2021 with a similar test. These demonstrations were not just technical achievements—they were geopolitical statements of capability and intent (Weeden, 2010).

In addition to kinetic threats, there is a growing focus on **non-kinetic** and **cyber-based** tools. For example, laser systems, signal jammers, and hacking technologies can disable or manipulate satellites without creating debris. The United States has deployed the Counter Communications System (CCS), which is capable of jamming enemy satellites temporarily (Harrison et al., 2020).

Perhaps even more concerning is the rise of **dual-use technologies**, such as satellite servicing vehicles. These spacecraft are designed to repair or refuel satellites but could just as easily be used to interfere with or disable an adversary's assets. The ambiguity surrounding these technologies makes it hard to distinguish peaceful missions from hostile acts.

B. Defensive Systems

Modern military strategies are also focused on defense and resilience. The development of **distributed satellite networks**, such as SpaceX's Starlink, has changed the landscape of space infrastructure. These networks are harder to target due to their redundancy and high number of nodes. During the war in Ukraine, Starlink was instrumental in maintaining communications, showing how commercial platforms can be integrated into national defense (O'Callaghan, 2022).

Governments are also enhancing their **space situational awareness (SSA)**. The U.S. Space Force operates sophisticated tracking systems like the Space Surveillance Telescope and the Space Fence, which can detect thousands of objects in orbit (USSF, 2021). These capabilities are essential for early warning, collision avoidance, and attribution of hostile acts.

5. Key Actors and Strategies

United States: The U.S. is arguably the most advanced military space power. The creation of the U.S. Space Force in 2019 signified a formal recognition that space is now a warfighting domain. U.S. strategies focus on maintaining superiority through resilient satellite constellations and developing next-generation capabilities (DoD, 2022).

China: China has rapidly accelerated its space ambitions. Its military strategy integrates space-based capabilities for command, control, surveillance, and precision targeting. The People's Liberation Army sees space as vital to its goal of "informationized" warfare (Kulacki, 2019).

Russia: Russia emphasizes asymmetrical capabilities, including electronic warfare and "inspector" satellites that can approach and potentially disable enemy satellites. Moscow's military doctrine views space as a key enabler of strategic deterrence (Moltz, 2019).

Emerging Players: Other states are entering the space arena. India demonstrated its capabilities with the ASAT Mission Shakti test in 2019. Meanwhile, the European Union is developing its own secure satellite infrastructure with the IRIS² project, aiming to reduce dependency on foreign systems (ESA, 2023).

6. Governance Challenges

International efforts to govern space have not kept pace with technological and strategic developments. The **Outer Space Treaty** prohibits weapons of mass destruction in orbit but is silent on conventional weapons and provides no enforcement mechanism (UNOOSA, 2022).

Monitoring space activity is also problematic. Many military and dual-use satellites operate covertly, and attribution for space-based attacks is extremely difficult. Verification mechanisms are lacking, making it hard to hold violators accountable.

Moreover, the role of **private companies** adds a new layer of complexity. SpaceX, Blue Origin, and other firms now operate significant portions of the global satellite infrastructure. While this innovation is welcome, it also raises concerns about accountability and regulation in times of conflict.

7. Potential Conflict Scenarios

One of the most alarming risks of space militarization is the possibility of **conflict escalation**. An attack on a satellite—whether intentional or accidental—could be misinterpreted as a prelude to war. Given that many satellites are critical to nuclear command-and-control, this misperception could be catastrophic (Acton, 2018).

The **Kessler Syndrome**, a hypothetical scenario in which space debris from collisions creates a cascade of further collisions, could render entire orbital bands unusable. This would cripple both military and civilian capabilities in space (Kessler & Cour-Palais, 1978).

The **blindness effect** refers to the loss of early-warning satellites, which could make it difficult to detect incoming missile threats. This raises the risk of preemptive strikes and undermines strategic stability (Panda, 2021).

8. Discussion

The militarization of space, as outlined in the paper The New Frontier of Conflict: Space Militarization and the Erosion of Global Governance, represents a transformative shift in international security dynamics. The paper highlights how major powers—namely the United States, China, Russia, and emerging actors like India—are advancing their military capabilities in space, raising significant risks of conflict escalation and undermining global governance frameworks. This discussion evaluates the implications of these developments, synthesizes the paper's findings through theoretical lenses, and explores the broader consequences for international stability, governance, and the future of space as a shared domain. By integrating insights from realism, liberal institutionalism, and the security dilemma, this analysis addresses the challenges of militarization, the limitations of current governance mechanisms, and the urgent need for cooperative solutions to prevent space from becoming a battlefield.

Implications of Space Militarization

The paper's analysis of the current state of space militarization reveals a rapidly evolving landscape where offensive and defensive capabilities are reshaping strategic calculations. The development of kinetic anti-satellite (ASAT) weapons, as demonstrated by China's 2007 test and Russia's 2021 test, underscores the potential for destructive actions in space that could generate debris and destabilize the orbital environment (Weeden, 2010). These actions not only threaten operational satellites but also risk triggering the Kessler Syndrome, where cascading collisions render entire orbital bands unusable (Kessler & Cour-Palais, 1978). The paper's emphasis on non-kinetic threats, such as cyber-attacks and signal jammers, further complicates the security landscape. For instance, the U.S. Counter Communications System (CCS) demonstrates how states can disrupt adversaries' satellite operations without physical destruction, yet these actions still heighten tensions due to their covert nature and attribution challenges (Harrison et al., 2020).

Defensive systems, such as distributed satellite networks like Starlink, highlight the dual role of commercial actors in militarization. While these networks enhance resilience, their integration into national defense strategies, as seen in Ukraine, blurs the line between civilian and military applications (O'Callaghan, 2022). This convergence raises questions about the accountability of private companies and their potential to exacerbate conflicts. The paper's discussion of space situational awareness (SSA) systems, such as the U.S. Space Fence, illustrates efforts to monitor and mitigate risks, but these capabilities also enable states to track adversaries' assets, potentially fueling mistrust and preemptive strategies (USSF, 2021).

From a realist perspective, these developments reflect the anarchic nature of the international system, where states prioritize power and security (Waltz, 1979). The establishment of the U.S. Space Force and China's focus on "informationized" warfare demonstrate how space has become a critical domain for achieving strategic dominance (DoD, 2022; Kulacki, 2019). The security dilemma exacerbates this dynamic, as defensive measures, such as resilient satellite constellations, can be perceived as offensive preparations, prompting adversaries to escalate their own capabilities (Jervis, 1978). For example, Russia's "inspector" satellites, designed for proximity operations,

may be intended for maintenance but are viewed as potential threats by other states (Moltz, 2019). This cycle of action and reaction underscores the paper's argument that militarization risks transforming space into a contested arena.

Governance Challenges and Institutional Weaknesses

The paper's examination of governance challenges highlights the inadequacy of existing frameworks, particularly the 1967 Outer Space Treaty (OST), in addressing modern space activities. The OST's prohibition of weapons of mass destruction in space does not extend to conventional or non-kinetic weapons, leaving a significant regulatory gap (UNOOSA, 2022). The treaty's vague definition of "peaceful use" allows states to justify military activities under the guise of defense, undermining its normative authority (Bledsoe & Whitehead, 2017). The absence of enforcement mechanisms and verification protocols further limits the treaty's effectiveness, as states operate covertly with little accountability.

The involvement of private actors, such as SpaceX and Blue Origin, introduces additional complexity. As the paper notes, these companies control significant portions of global satellite infrastructure, yet their operations fall outside traditional state-centric governance models. This raises concerns about compliance with international norms, especially in conflict scenarios where commercial assets may be targeted or co-opted for military purposes. The paper's reference to the Artemis Accords as a potential norm-setting initiative reflects a liberal institutionalist approach, emphasizing cooperation and transparency (Keohane & Nye, 1977). However, the accords' limited membership and voluntary nature restrict their impact, as major powers like China and Russia remain outside the framework.

The paper also identifies monitoring and attribution as critical governance challenges. The covert nature of many space activities, combined with the difficulty of distinguishing between peaceful and hostile intent in dual-use technologies, complicates efforts to enforce accountability (Johnson, 2016). The lack of an international body with the authority to investigate violations, as proposed in the paper's recommendation for a space monitoring agency, perpetuates this gap. Liberal institutionalism suggests that such an agency could foster trust and reduce the security dilemma by providing transparency, but realist scholars argue that powerful states are unlikely to cede sovereignty to such mechanisms due to strategic interests (Mearsheimer, 2014).

Risks of Conflict Escalation

The paper's exploration of potential conflict scenarios, such as attacks on satellites or the Kessler Syndrome, underscores the catastrophic risks of militarization. Satellites are integral to nuclear command-and-control systems, and their disruption could lead to misperceptions and escalation, potentially triggering terrestrial conflicts (Acton, 2018). The "blindness effect," where the loss of early-warning satellites impairs missile detection, further heightens the risk of preemptive strikes (Panda, 2021). These scenarios illustrate the interconnectedness of space and terrestrial security, where actions in orbit could have far-reaching consequences.

The security dilemma provides a critical lens for understanding these risks. As states enhance their space capabilities to deter adversaries, they inadvertently signal aggressive intent, prompting countermeasures (Jervis, 1978). For example, India's 2019 Mission Shakti test was framed as a defensive measure, yet it was perceived as a challenge to China and Pakistan, escalating regional tensions (Moltz, 2019). Similarly, the U.S.'s development of advanced SSA systems could be interpreted as preparation for offensive operations, further fueling mistrust. Constructivist insights suggest that reshaping norms around responsible behavior in space could mitigate these risks, but entrenched militarized identities among major powers hinder such efforts (Wendt, 1999).

Policy Recommendations and Feasibility

The paper's policy recommendations offer a roadmap for addressing these challenges, combining realist pragmatism with liberal aspirations for cooperation. Revising the OST to include conventional weapons and clearer definitions of prohibited actions is a critical step, but its feasibility is limited by geopolitical rivalries. Major powers are unlikely to agree on binding restrictions that constrain their strategic options, as seen in the stalled negotiations over the Prevention of an Arms Race in Outer Space (PAROS) treaty (Krepon & Heller, 2019). Promoting norms of responsible behavior, such as those in the Artemis Accords, is more achievable in the short term, as voluntary agreements require less political capital. However, their effectiveness depends on broader participation, particularly from China and Russia.

The proposal for an international space monitoring agency, modeled after the International Atomic Energy Agency (IAEA), is a bold but challenging recommendation. Such an agency could enhance transparency and attribution, reducing the security dilemma by clarifying state intentions. However, establishing it would require overcoming significant hurdles, including funding, authority, and state compliance. Realist scholars would argue that powerful states are unlikely to support an agency that could expose their covert operations (Mearsheimer, 2014). Nonetheless, incremental steps, such as joint SSA initiatives or data-sharing agreements, could build trust and lay the groundwork for more robust mechanisms.

Mandating debris mitigation measures is both urgent and feasible, given the shared interest in preserving the orbital environment. The paper's emphasis on safe deorbiting and collision avoidance aligns with existing guidelines from the Inter-Agency Space Debris Coordination Committee (IADC), but enforcement remains a challenge. An independent verification body could strengthen compliance, but its implementation would require consensus among spacefaring nations and private actors. Finally, enhancing multilateral cooperation through platforms like the UN Committee on the Peaceful Uses of Outer Space (COPUOS) is essential for fostering dialogue. While COPUOS has facilitated discussions, its lack of binding authority limits its impact, underscoring the need for more robust institutional frameworks (Deudney, 2020).

Broader Implications and Future Directions

The militarization of space reflects broader trends in global power dynamics, where technological advancements and geopolitical rivalries converge to challenge cooperative norms. The paper's call for urgent action is timely, as the window to prevent space from becoming a fully militarized domain is narrowing. The involvement of commercial actors, as highlighted by the role of Starlink and other private systems, suggests that future governance frameworks must account for non-state actors, whose influence is reshaping the space landscape. Additionally, the paper's mention of artificial intelligence (AI) and cyber-physical systems as areas for further research is critical, as these technologies could amplify the risks of militarization by enabling autonomous weapons or sophisticated cyber-attacks.

From a theoretical perspective, the interplay of realism, liberalism, and constructivism underscores the complexity of addressing space militarization. Realism highlights the structural constraints driving competition, while liberalism offers hope for cooperative solutions through institutional reform. Constructivism emphasizes the potential to reshape state identities and norms, but this requires overcoming entrenched militarized narratives. The security dilemma serves as a unifying concept, illustrating how well-intentioned actions can spiral into conflict without clear communication and trust-building measures.

9. Policy Recommendations

1. **Revise and Expand the Outer Space Treaty**: The OST must be updated to include conventional weapons and more detailed definitions of prohibited actions.
2. **Promote Norms of Responsible Behavior**: Voluntary agreements, such as those proposed in the Artemis Accords, should be expanded into universal norms on satellite operations and proximity.

3. **Establish an International Space Monitoring Agency**: Modeled after the IAEA, this body could track satellite activity and investigate violations.
4. **Mandate Debris Mitigation Measures**: All satellite launches should include plans for safe deorbiting and collision avoidance. Compliance should be verified by an independent body.
5. **Enhance Multilateral Cooperation**: Major spacefaring nations must engage in regular dialogue through the UN Committee on the Peaceful Uses of Outer Space (COPUOS) to prevent misunderstandings and build trust.

10. Conclusion

We are standing at a critical juncture in history. The choices we make now will determine whether outer space remains a realm of exploration and innovation or devolves into yet another domain of rivalry and conflict. This paper has shown that the militarization of space is real, accelerating, and largely ungoverned.

While technology has leapfrogged ahead, international legal and institutional frameworks remain rooted in the Cold War era. Unless urgent reforms are pursued—both legal and institutional—space could become a trigger for conflict rather than a platform for peace.

As we look toward the future, more research is needed on the role of artificial intelligence in space warfare, the influence of commercial actors, and the unique vulnerabilities of cyber-physical systems in orbit. The window to act is closing. We must treat space not just as a technological domain but as a shared global commons that requires collective stewardship.

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