Priviet Social Sciences Journal
E-ISSN 2798-866X
P-ISSN 2798-6314
https://doi.org/10.55942/pssj.v5i10.715

Volume 5
Issue 10
October Edition 2025

Dual use satellites in the Ukraine conflict: The dilemma between state sovereignty and the principle of non-militarization of outer space

Nuriyah Fara Muthia*, Afif Muhni, Nurisnah H

Faculty of Law, Universitas Hasanuddin, Jl. Pintu Dua Unhas No.KM.10, Jl. Pintu II, Tamalanrea Indah, Kec. Tamalanrea, Kota Makassar, Sulawesi Selatan 90245 Indnonesia
e-mail: nfaramuthia@unhas.ac.id

Received 09 August 2025
Revised 24 September 2025
Accepted 03 October 2025

ABSTRACT

The increasing reliance on commercial satellite networks during armed conflicts has revealed substantial deficiencies in international space law. The Russia–Ukraine conflict serves as a pivotal case study, wherein Ukraine's utilization of SpaceX's Starlink satellite constellation for military communications obscured the distinction between civilian and military objects. This dual-use characteristic poses challenges to the traditional principles of international law, including state sovereignty over airspace, as delineated by the 1944 Chicago Convention, the freedom of outer space, as established by the 1967 Outer Space Treaty, and the principle of distinction under international humanitarian law. This study employs doctrinal legal analysis to assess whether dual-use satellites should be deemed legitimate military targets and to what extent states are accountable for the actions of private space actors. It contends that existing frameworks inadequately address the militarization risks posed by commercial satellites in low Earth orbit. The study concludes that new normative measures – whether through treaty amendments, interpretive declarations, or soft law instruments – are urgently needed to reconcile the competing principles of state sovereignty, civilian protection, and non-militarization of outer space.

Keywords: dual-use satellites, international law, outer space treaty, Ukraine conflict, airspace sovereignty.

1. INTRODUCTION

The rapid development of space technology has transformed outer space from a domain of scientific exploration into critical infrastructure for global security, communication, and economic growth. Satellites underpin a wide range of essential services, including navigation, surveillance, and disaster response. Although international space law, particularly the 1967 Outer Space Treaty (OST), was originally designed to promote the peaceful use of outer space, recent technological advancements have raised pressing concerns regarding the increasing militarization of this domain (von der Dunk, 2020).

The Russia–Ukraine conflict illustrates this dilemma with unprecedented clarity. Since the Russian invasion in 2022, Ukraine has relied heavily on the Starlink satellite constellation operated by SpaceX to maintain internet connectivity and secure communications amid large-scale attacks on terrestrial infrastructure. Reports indicate that Starlink has been employed not only for civilian purposes but also for military coordination, such as drone navigation and battlefield commands (Williams, 2023). This dual functionality complicates the traditional distinction between civilian and military assets in international law.

Russia has repeatedly condemned the use of commercial satellites in conflicts, warning that such systems could be considered legitimate military targets. Such statements challenge the longstanding principle of the peaceful use of outer space and raise the prospect of armed conflict extending beyond terrestrial boundaries (Schmitt, 2022). The potential targeting of commercial satellites risks undermining both international humanitarian law (IHL), which mandates the protection of civilian objects, and space law, which envisions outer space as a global common reserved for peaceful purposes.

International humanitarian law stipulates that civilian objects lose protection when used for military purposes. However, the legal classification of dual-use satellites remains deeply contested. If commercial satellites are used directly to support military operations, they may be deemed military objectives. However, such an interpretation risks destabilizing the principle of proportionality, as the disruption of civilian communication services could cause disproportionate harm to civilian populations (Boothby, 2019).

Another unresolved issue concerns the responsibility of states for the activities of private space actors. Article VI of the OST stipulates that states bear international responsibility for national activities in outer space, regardless of whether these are carried out by governmental or non-governmental entities. This principle becomes problematic when private corporations, such as SpaceX, provide services that directly affect the conduct of hostilities in armed conflicts. The blurred boundary between state obligations and corporate autonomy generates significant uncertainty in the application of international law (Jakhu & Pelton, 2020).

The current situation also underscores the inadequacy of existing legal instruments to address the realities of twenty-first century conflicts. Neither the OST nor the Liability Convention provides sufficient clarity on the legal implications of weaponising or targeting dual-use satellite infrastructure. Meanwhile, soft-law initiatives, such as the United Nations Guidelines for the Long-term Sustainability of Outer Space Activities, have yet to achieve binding legal authority (Ferreira-Snyman, 2018).

These gaps raise significant questions regarding the interpretation and evolution of international law. Should dual-use satellites receive enhanced protection to safeguard civilian populations, or should their military applications render them legitimate targets? How can states be held accountable for the actions of private corporations in outer space, particularly when these corporations operate across multiple jurisdictions? These questions are central to contemporary debates regarding the future of air and space law. The Russia–Ukraine conflict is not an isolated incident but a precursor to future disputes. As more states and private entities deploy commercial satellite constellations, the risk of entangling civilian infrastructure in armed conflicts will inevitably increase. This underscores the necessity of legal regulation of dual-use satellites as an urgent requirement for international stability (Singh, 2021).

This study aims to contribute to the evolving discourse by examining the status of dual-use commercial satellites under the international law. It explores how the principles of airspace sovereignty, outer space demilitarization, and international humanitarian law (IHL) interact within the context of

contemporary armed conflict. By employing a case study approach, this paper offers both a conceptual framework and a practical analysis of how current legal norms apply—or fail to apply—to modern satellite technologies. Ultimately, this research contends that international law must evolve to reconcile the competing imperatives of state sovereignty, civilian protection, and peaceful use of outer space. Without clearer legal guidance, the increasing reliance on commercial satellite systems risks undermining both international security and the humanitarian principles at the core of the law of armed conflict.

2. METHOD

This study adopts a doctrinal legal research methodology, often referred to as normative juridical research. This method emphasizes the analysis of legal norms, treaties, customary practices, and authoritative interpretations that govern air and outer space law. This approach is particularly appropriate for addressing questions concerning airspace sovereignty, the demilitarization of outer space, and the implications of dual-use satellite systems during armed conflicts (Singh, 2021).

The research draws upon primary legal sources, including international treaties such as the 1944 Chicago Convention on International Civil Aviation, the 1967 Outer Space Treaty, the 1972 Liability Convention, and the 1977 Additional Protocol I to the Geneva Conventions. These are complemented by United Nations General Assembly resolutions, International Court of Justice (ICJ) advisory opinions, and recent state practices regarding the military use of commercial satellites. Secondary sources include peer-reviewed journal articles, scholarly monographs, and contemporary analyses of international space law, with particular emphasis on works published in the past five years (Jakhu & Pelton, 2020; Ferreira-Snyman, 2018).

In addition to doctrinal analysis, this study employs a case study methodology, focusing on the Russia–Ukraine conflict as an illustrative example of how dual-use satellite technologies challenge existing legal frameworks. This case study enables a contextualized evaluation of treaty interpretation, state practice, and legal reasoning in both air and space law (Schmitt, 2022).

The analysis is conducted using a qualitative descriptive approach, emphasizing the systematic interpretation of legal texts in light of fundamental principles such as the peaceful use of outer space, non-intervention, and the protection of civilian objects. Although this study does not employ quantitative data, its qualitative focus ensures a rigorous assessment of the normative gaps within existing legal instruments and proposes potential reforms to strengthen international law in this domain (von der Dunk, 2020).

2.1 THEORETICAL AND LEGAL FRAMEWORK

The legal regulation of outer space and airspace reflects two distinct but interconnected branches of international law. While the law of airspace emphasizes the sovereignty of states over the skies above their territory, the law of outer space envisions a regime of non-appropriation and peaceful use. The interaction between these two domains has become increasingly complex in the context of modern satellite technology, where the distinction between civilian and military applications has become blurred. Understanding this framework requires an examination of the Chicago Convention, Outer Space Treaty, Liability Convention, and international humanitarian law (IHL).

The 1944 Chicago Convention on International Civil Aviation established the fundamental principle that every state has complete and exclusive sovereignty over the airspace above its territory. This principle ensures that no state or private actor can operate an aircraft within another state's airspace without explicit authorization (ICAO, 2020). While primarily concerned with civil aviation, the Convention provides a foundational distinction between airspace, which is subject to territorial sovereignty, and outer space, which is governed by a different legal regime. However, the absence of a precise boundary between airspace and outer space complicates the regulation of satellites that traverse both domains, raising interpretive challenges for international law (Jakhu & Pelton, 2020).

In contrast, the 1967 Outer Space Treaty (OST) enshrines the principle that outer space, including the Moon and other celestial bodies, is not subject to national appropriation and must be used for peaceful

purposes. Article IV prohibits the placement of nuclear weapons or other weapons of mass destruction in orbit, reflecting the treaty's origins during the Cold War. However, the OST is silent on the conventional military use of outer space, including reconnaissance satellites or dual-use commercial systems (von der Dunk, 2020). This silence leaves open significant interpretive space regarding whether the militarization of commercial satellite constellations is consistent with the treaty's intent.

The 1972 Liability Convention complements the OST by establishing that states are internationally liable for damage caused by their space objects, regardless of whether such objects are launched by government agencies or private actors. Article II provides for absolute liability for damage caused on the surface of the Earth or to aircraft in flight, while Article III imposes fault-based liability for damage in outer space. This framework reinforces the principle articulated in Article VI of the OST: states bear responsibility for national activities in outer space, including those conducted by non-governmental entities. In the context of dual-use satellites, however, questions remain as to how liability would be assessed if a commercial satellite were attacked as a military objective, causing collateral damage to civilian services (Ferreira-Snyman, 2018).

A parallel body of law, international humanitarian law (IHL), adds further complexity to the regulation of dual-use satellites. Under Additional Protocol I to the Geneva Conventions (1977), civilian objects must not be attacked unless they are used to make an effective contribution to military action and their destruction offers a definite military advantage. This principle suggests that dual-use satellites may lose their civilian protection once employed for military coordination. However, proportionality and precautionary obligations continue to apply, meaning that attacks causing excessive civilian harm remain unlawful (Boothby, 2019).

The interaction between space law and IHL exposes a significant normative gap. Space law envisions outer space as a peaceful domain; however, it provides no detailed rules on the conduct of hostilities involving space assets. Conversely, the IHL regulates hostilities but was developed with terrestrial warfare in mind, offering little guidance on how to apply its principles to satellites orbiting hundreds of kilometers above the Earth's surface (Schmitt, 2022). This tension underscores the urgent need for a coherent framework to address dual-use technology.

Emerging soft law instruments, such as the United Nations Guidelines for the Long-term Sustainability of Outer Space Activities and the proposed Code of Conduct for Outer Space Activities, attempt to address some of these gaps. Nevertheless, their non-binding nature and limited adoption constrain their efficacy in resolving disputes concerning dual-use satellites from a legal perspective. As commercial constellations expand and states increasingly depend on them for civilian and military applications, the absence of binding norms poses a risk to the stability of outer space governance (Singh, 2021). In conclusion, the current legal framework establishes broad principles of sovereignty, peaceful use, and civilian protection but lacks sufficient clarity to regulate dual-use commercial satellites. This legal ambiguity becomes particularly problematic during armed conflicts, where the risk of escalation into outer space is no longer theoretical but an imminent reality, as evidenced by the Russia–Ukraine War.

2.2 CASE STUDY: THE RUSSIA - UKRAINE CONFLICT AND THE STARLINK PRECEDENT

The Russia–Ukraine conflict represents the most significant test case for the applicability of international air and space law in the twenty-first century. Unlike earlier armed conflicts, where space assets played a limited and often state-controlled role, the Ukraine war has demonstrated the centrality of commercial satellite systems in both civilian and military operations in Ukraine. Among these, Ukraine's deployment of Starlink stands out as a groundbreaking precedent with far-reaching legal implications.

Starlink, a satellite internet constellation operated by SpaceX, was initially deployed in Ukraine to restore internet connectivity following the large-scale disruption of the terrestrial communication infrastructure caused by Russian cyber and kinetic attacks. Although its original purpose was humanitarian, evidence soon emerged that the system was also being employed for military purposes, including coordinating drone strikes, securing battlefield communication, and facilitating command and control

operations (Williams, 2023). This dual-use functionality challenges the traditional categorization of space assets as civilian or military.

From Russia's perspective, Starlink's involvement constitutes a form of direct participation in the conflict by a private commercial actor, albeit with the support of a foreign state. Russian officials have repeatedly argued that commercial satellites used for military purposes could be regarded as legitimate targets under the law of armed conflict. Such statements have raised concerns that Russia may seek to disable or destroy these systems, either through cyber operations, electronic jamming, or even direct kinetic attacks (Schmitt, 2022). This possibility introduces the grave risk of escalating the conflict into outer space, thereby undermining the principle of peaceful use enshrined in the Outer Space Treaty.

However, Ukraine and its allies maintain that the use of Starlink does not fundamentally alter the legal status of the satellite constellation. They argue that while Starlink may provide incidental military benefits, its primary function remains civilian – ensuring that hospitals, schools, and government institutions can continue to operate under wartime conditions. This interpretation aligns with the principle of proportionality under international humanitarian law, which cautions against categorizing dual-use objects as legitimate military targets when doing so would result in disproportionate harm to civilians (Boothby, 2019).

The case also highlights unresolved questions regarding state responsibility for the conduct of private space actors. SpaceX is a private corporation, but its provision of services to Ukraine was facilitated by the United States government. Under Article VI of the Outer Space Treaty, the United States bears international responsibility for ensuring that activities conducted by its private entities conform to treaty obligations. If Starlink is deemed militarized, the issue arises as to whether the United States could be held accountable under international law for enabling its use in an armed conflict (Jakhu & Pelton, 2020).

This situation is further complicated by the fact that Starlink operates on a global scale, with satellites orbiting above multiple jurisdictions. The extraterritorial nature of satellite operations makes it difficult to apply the traditional concepts of sovereignty and territorial jurisdiction. Unlike aircraft, which operate within defined airspaces, satellites orbit through international space, creating legal ambiguities regarding the extent of state control and accountability (Singh, 2021).

The Russia–Ukraine conflict raises significant concerns regarding the sufficiency of current liability mechanisms. If Russia targets Starlink satellites, resulting in disruptions to global Internet services, the economic and humanitarian repercussions could extend well beyond Ukraine. According to the Liability Convention, the state responsible for such actions could, in theory, be held accountable for the incurred damages. However, the Convention's dependence on state-to-state claims and the lack of explicit provisions concerning military targeting cast doubt on its efficacy in these circumstances (Ferreira-Snyman, 2018). Moreover, the precedent established by Starlink has broader implications for the future of commercial satellite constellations. As more states and private entities deploy extensive satellite networks, the probability of these systems becoming entangled in armed conflict increases. In the absence of clearer legal frameworks, the risk of outer space evolving into an extension of terrestrial battlefields is significantly increased. Consequently, the Ukraine conflict serves as both a cautionary tale and a catalyst for reform: unless international law evolves, the militarization of commercial satellite infrastructure could jeopardize humanitarian protections and the peaceful nature of outer space.

3. RESULT AND DISCUSSION

The deployment of Starlink in the Ukraine conflict brings to the forefront the critical tensions between established legal frameworks and the realities of modern warfare. International humanitarian law (IHL), space law, and air law provide important but fragmented rules that are challenged by the dual-use nature of commercial satellite constellations. This section explores the legal ambiguities and gaps that emerge from this unprecedented case, highlighting the urgent need for doctrinal clarification and possible reforms.

The dual-use dilemma illustrates the inadequacy of existing IHL classifications. Article 52 of Additional Protocol I defines civilian objects as those that do not make an effective contribution to military

action. However, Starlink, while primarily designed for civilian communication, has demonstrably facilitated military operations in Ukraine, such as drone coordination and battlefield communications (Williams, 2023). The rigid binary between civilian and military objects becomes problematic when applied to technologies that serve both functions simultaneously. Unlike traditional infrastructure, disabling Starlink would produce global ripple effects, blurring the line between lawful military targeting and unlawful, disproportionate harm.

The principle of proportionality under IHL becomes extremely difficult to apply in the context of satellite network attacks. Attacks must not cause excessive incidental civilian harm in relation to the anticipated military advantage. However, a strike against even part of the Starlink constellation could disrupt communications for hospitals, schools, and civilian governance, not only in Ukraine but also in other countries relying on the same network. This extraterritorial civilian dependency creates a disproportionality calculus that the existing legal doctrine has not anticipated (Boothby, 2019).

Under the Outer Space Treaty (OST) of 1967, Article VI requires states to authorize and continuously supervise the space activities of private actors. Starlink's involvement in Ukraine, while initiated by SpaceX as a private entity, was facilitated and politically supported by the U.S. government. This creates a strong argument that the United States bears international responsibility for the activities of satellite systems. However, the OST provides no enforcement mechanisms or dispute resolution processes beyond diplomatic negotiations, leaving ambiguity about accountability when private actors effectively participate in armed conflict (Jakhu & Pelton, 2020).

State responsibility intersects uneasily with the concept of neutrality in international armed conflict. If a neutral state permits its corporations to provide satellite services with significant military utility, questions arise as to whether such support compromises neutrality under international law. The law of neutrality, rooted in early twentieth-century conventions, was never designed to address the extraterritorial reach of orbital infrastructure. The Ukraine case suggests that states may be held politically, if not legally, accountable for the militarization of commercial assets under their jurisdiction, thereby eroding traditional neutrality.

The sovereignty regime under the Chicago Convention (1944) is difficult to reconcile with the use of low Earth orbit (LEO) constellations. Article 1 of the Convention affirms complete and exclusive sovereignty over national airspace, but the Convention does not extend to outer space, the boundary of which remains undefined. Starlink satellites operate in LEO, an orbital region close enough to be seen as an extension of airspace but legally treated as outer space. This uncertainty leaves unresolved whether states have any sovereign rights to restrict or regulate satellites passing overhead, even when those satellites are directly involved in nearby conflicts (Singh, 2021).

The absence of a clear boundary between airspace and outer space exacerbates this legal ambiguity. Without a universally recognized delimitation, the overlap between air and space law remains unsettled. In the Ukrainian context, this means that there is no legal basis for Ukraine—or Russia—to assert control over the passage of Starlink satellites, even though their activities directly affect military operations on the ground. This gap creates a lacuna where international law fails to regulate the strategic use of near-space infrastructure.

The Liability Convention (1972) also reveals its inadequacy. Article II establishes absolute liability for damage caused by space objects on the surface of the Earth or to aircraft, and Article III provides for fault-based liability in outer space. However, these provisions presuppose accidents and not deliberate wartime targeting. If Russia were to destroy or disable Starlink satellites, the resulting economic and humanitarian damage could affect several states. However, the Convention lacks clear rules for attributing responsibility in such wartime scenarios, leaving a legal vacuum that undermines deterrence (Ferreira-Snyman, 2018).

The principle of the peaceful use of outer space, enshrined in Article IV of the OST, is also under strain. While the OST prohibits the placement of weapons of mass destruction in orbit, it does not explicitly regulate the military use of space assets or target dual-use satellites. Therefore, the use of Starlink for battlefield communication does not violate the letter of the OST but arguably contravenes its spirit by

furthering the militarization of outer space. This demonstrates the limits of a treaty drafted in the Cold War era, which is ill-equipped for the age of private mega-constellations (von der Dunk, 2020).

The Ukraine conflict revealed the absence of a protective regime for essential civilian services provided by space infrastructure. Just as international law prohibits attacks on objects indispensable to civilian survival, such as water facilities or food supplies, there is a compelling argument that satellite systems ensuring communication in emergencies should be afforded similar protection. However, no explicit legal framework recognizes this category in the space domain, leaving a normative gap that exposes civilians to risk.

The extraterritorial effects of attacking a satellite constellation amplify the problem of proportionality and distinction. Unlike traditional military targets, satellites provide services to multiple jurisdictions simultaneously. Thus, an attack directed at a dual-use satellite serving Ukraine could inadvertently harm third-party states that are uninvolved in the conflict. This scenario risks violating the principle of distinction under IHL, which requires parties to direct their operations only against military objectives (Schmitt, 2022).

The Ukraine case also highlights the growing role of private actors in warfare, which traditional international law did not anticipate. While the OST holds states responsible for private activities, it does not impose direct obligations on corporations. As private space companies increasingly operate infrastructure with military relevance, the absence of direct legal duties creates significant accountability gaps. The Starlink precedent suggests that without a clearer regulatory framework, private corporations may wield disproportionate influence in conflict dynamics without being directly bound by international humanitarian law.

There is a risk of norm erosion if states begin to accept the militarization of commercial constellations as a fait accompli. The normalization of dual-use targeting could accelerate the weaponization of outer space, undermining both the OST and broader UN principles of the peaceful use of space. This trend risks destabilizing the global governance frameworks that have maintained relative stability in orbital activities until now.

One possible interpretive solution lies in expanding the application of IHL to space assets and treating dual-use satellites with greater caution. In its Nuclear Weapons Advisory Opinion (1996), the International Court of Justice (ICJ) emphasized the applicability of IHL principles to all domains of warfare. Extending this logic, satellites integral to civilian survival could be considered protected objects unless the military necessity is overwhelming and proportionate. Such an interpretation would bring greater coherence to space and humanitarian law.

Another solution lies in soft law instruments, such as the UN Guidelines for the Long-Term Sustainability of Outer Space Activities. Although non-binding, these instruments can be developed to address dual-use risks, encourage transparency in satellite operations, and establish industry best practices. If endorsed by a wide coalition of states, these norms could acquire the status of customary international law over time, thereby filling gaps left by outdated treaties.

The conflict in Ukraine highlights the pressing need for the development of a new international instrument—either as a supplementary protocol to the Outer Space Treaty (OST) or as an independent treaty—that specifically addresses dual-use satellites. Such a framework could elucidate the conditions under which dual-use assets forfeit protection, codify proportionality safeguards, and establish mechanisms for attributing state responsibilities. In the absence of such reforms, future conflicts may destabilize the space domain and compromise the delicate balance between civilian protection and military necessity.

3.1 POLICY RECOMMENDATIONS

The case study of the Starlink constellation in the Russia–Ukraine conflict demonstrates that existing international legal frameworks are insufficient to address the complexities of dual-use satellite technology. Several policy recommendations can be advanced to ensure that space remains a domain for peaceful purposes while protecting civilians from the risks of militarized commercial infrastructure.

First, the international community should clarify the legal status of dual-use satellites under the International Humanitarian Law (IHL). An interpretative declaration or protocol could specify the conditions under which commercial satellites providing essential civilian services retain protection, even when they provide incidental military advantages. This clarification would strengthen the principle of distinction and reduce ambiguity regarding the legitimacy of targeting such assets.

Second, States should adopt a supplementary protocol to the Outer Space Treaty (OST) addressing private actors. Although Article VI of the OST places responsibility on states, it does not directly bind private corporations. A supplementary instrument could establish minimum obligations for private space companies, such as transparency in service provision during conflicts, safeguards for humanitarian access, and compliance with the principle of proportionality.

Third, a new liability framework should be developed to address the wartime targeting of space assets. The current Liability Convention is inadequate for deliberately destructive acts. A revised regime should distinguish between accidental damage and intentional targeting while establishing compensation mechanisms for third states or global users harmed by the destruction of dual-use constellations.

Fourth, States should work toward defining the boundary between airspace and outer space. The absence of clear delimitation creates regulatory ambiguity for low Earth orbit operations. Establishing a legal boundary would allow for a more coherent application of sovereignty principles and prevent disputes over jurisdiction in conflict situations.

Fifth, the UN should promote the recognition of satellite constellations as part of "critical civilian infrastructure" deserving enhanced protection. Just as water, energy, and health systems are protected under IHL, communications satellites are indispensable to civilian survival in modern societies. This recognition would deter indiscriminate targeting and ensure continuity of humanitarian services during conflicts.

Sixth, soft law mechanisms should be strengthened through transparency and confidence-building measures. Voluntary guidelines, such as the UN Guidelines for the Long-Term Sustainability of Outer Space Activities, could be expanded to include best practices for dual-use satellites. These include prior notification of intended uses, transparency about government involvement, and cooperative mechanisms for conflict de-escalation.

Seventh. Regional organizations must assume a more proactive role. Entities such as the European Union, ASEAN, and the African Union could adopt regional codes of conduct for the use of commercial satellites in armed conflict. Such initiatives would not only fill gaps at the global level, but also provide platforms for consensus-building and norm diffusion.

Eighth, greater collaboration between spacefaring nations and neutral states should be institutionalized. Neutral states can play a mediating role in developing norms for dual-use satellites, ensuring that the balance between state security and civilian protection is not dominated by geopolitical rivalries. Establishing neutral monitoring bodies or advisory panels could help depoliticize legal developments in this field.

Ninth, States and international organizations should invest in research and capacity building. Academic institutions, think tanks, and space law associations should be supported to conduct interdisciplinary studies on dual-use risks by combining perspectives from international law, security studies, and technology policy. These studies can be incorporated into UN deliberations and treaty negotiations to ensure evidence-based policymaking.

4. CONCLUSION

The Russia–Ukraine conflict and the deployment of Starlink as a dual-use satellite system have highlighted significant deficiencies in the current framework of international air and space law. Although the Chicago Convention, Outer Space Treaty, Liability Convention, and international humanitarian law offer certain guiding principles, they fail to adequately address the complexities introduced by commercial constellations that simultaneously support civilian survival and military operations. This situation has exposed the fragility of existing doctrines, such as the principle of distinction, proportionality test, and

state responsibility for private actors. The analysis reveals that the demarcation between airspace and outer space, the liability of states for private space companies, and the protection of dual-use satellites remain unresolved. In the absence of clearer regulations, the militarization of commercial infrastructure threatens to destabilize the principle of the peaceful use of outer space and expose civilians to disproportionate harm. Thus, the Starlink precedent serves as both a cautionary tale and an opportunity to modernize international legal frameworks.

Policy reform is urgently required. Clarifying the legal status of dual-use satellites, recognizing communications infrastructure as critical civilian objects, and adopting new liability and accountability mechanisms are essential steps. Both binding instruments, such as a supplementary protocol to the Outer Space Treaty, and non-binding instruments, such as expanded UN guidelines, must be pursued concurrently to address the normative gaps revealed by this conflict. Ultimately, this study emphasizes the necessity of adapting international law to technological advancements. As commercial space activities become increasingly integral to both peacetime development and armed conflict, the law must evolve to ensure that space remains a domain governed by the principles of peace, humanitarian protection, and accountability. The precedent set by Starlink is unlikely to remain unique and will likely influence future conflicts. Therefore, it is imperative that the international community acts decisively to prevent the normalization of outer space warfare.

Ethical Approval
Not Applicable

Informed Consent Statement
Not Applicable

Authors' Contributions
NFM contributed to the conceptualization, research design, and served as the corresponding author. AM contributed to the doctrinal legal analysis and interpretation of international space law principles. NH contributed to the literature review, data collection, and assisted in manuscript preparation.

Disclosure statement
No potential conflict of interest was reported by the author(s).

Data Availability Statement
The data presented in this study are available on request from the corresponding author due to privacy reasons.

Funding
This research received no external funding.

Notes on Contributors

Nuriyah Fara Muthia
Nuriyah Fara Muthia is affiliated with Faculty of Law, Universitas Hasanudin.

Afif Muhni
https://orcid.org/0009-0003-7716-4425
Afif Muhni is affiliated with Faculty of Law, Universitas Hasanudin.

Nurisnah H
Nurisnah H is affiliated with Faculty of Law, Universitas Hasanudin

REFERENCES

Bílková, V. (2023). The conflict in Ukraine: Implications for jus in bello and human rights law. *Journal of International Humanitarian Legal Studies, 32*(1), 45–72. https://doi.org/10.1163/22116133-03201010

Boothby, W. H. (2019). New technologies and the law in war and peace. *Journal of Conflict and Security Law, 24*(3), 473–498. https://doi.org/10.1093/jcsl/krz018

Convention on International Civil Aviation ("Chicago Convention"), Dec. 7, 1944, 15 U.N.T.S. 295.

Convention on International Liability for Damage Caused by Space Objects ("Liability Convention"), Mar. 29, 1972, 961 U.N.T.S. 187.

Ferreira-Snyman, A. (2018). Selected legal challenges relating to the military use of outer space, with specific reference to the South African perspective. *Potchefstroom Electronic Law Journal, 21*(1), 1–41. https://doi.org/10.17159/1727-3781/2018/v21i0a5672

Geralt, B. (2024). Starlink's provision of telecommunication services during the time of armed conflict and its consequences from the perspective of public international law. *Acta Universitatis Lodziensis. Folia Iuridica, 106*(11), 195–213. https://doi.org/10.18778/0208-6069.106.11

Grunert, J. (2025). International humanitarian law in space. *Elgar Concise Encyclopedia of Space Law*, 241–255. https://doi.org/10.4337/9781802207361.00042

Grünfeld, K. (2022). NewSpace: The Star Wars soldier of the future? *Proceedings of the International Institute of Space Law, 65*(7), 110–127. https://doi.org/10.5553/iisl/2022065007010

Hong, J. (2022). A study on international law on the space weaponization in the New-Space era: Focusing on the principles of international humanitarian law. *Hapshin Theological Review, 33*(1), 161–188. https://doi.org/10.35227/hylr.2022.2.33.1.161

Jakhu, R., & Pelton, J. N. (2020). *Global space governance: An international study*. Springer. https://link.springer.com/content/pdf/10.1007/978-3-319-54364-2.pdf

Kawagishi, S. (2023). The qualification of the Ukraine conflict in international humanitarian law. In *International Humanitarian Law and Armed Conflicts in the 21st Century* (pp. 205–225). Springer. https://doi.org/10.1007/978-981-99-4374-6_13

Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts ("Additional Protocol I"), June 8, 1977, 1125 U.N.T.S. 3.

Semenchuk, M. R. (2024). International military-space cooperation of Ukraine: Legal aspects. *Visegrad Journal on Human Rights, 1*(14), 220–239. https://doi.org/10.61345/1339-7915.2024.1.14

Schmitt, M. N. (2022). War and peace in outer space: Legal norms and current state practice. *Harvard National Security Journal, 13*(1), 1–37.

Stephens, D., & Steer, C. (2015). Conflicts in space: International humanitarian law and its application to space warfare. *Social Science Research Network*. https://ssrn.com/abstract=2696435

Singh, A. (2021). Legal implications of low Earth orbit operations: Airspace or outer space? *Space Policy, 57*, 101429. https://doi.org/10.1016/j.spacepol.2021.101429

Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies ("Outer Space Treaty"), Jan. 27, 1967, 610 U.N.T.S. 205.

United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). (2019). *Guidelines for the long-term sustainability of outer space activities*. United Nations.

Van de Put, S., & Siemensma, A. R. E. (2024). A giant leap for humankind: Bridging space law and international humanitarian law. *Revue de droit militaire et de droit de la guerre, 62*(1), 45–70. https://doi.org/10.4337/mllwr.2024.01.02

Von der Dunk, F. G. (2020). *International space law*. Wolters Kluwer.

Williams, A. (2023, March 15). How Starlink is helping Ukraine's war effort. *The Guardian*. https://www.theguardian.com/technology/2023/mar/15/starlink-ukraine-elon-musk