

The Application of Neutrality Law on the Involvement Commercial Space Actors in Armed Conflict

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Abstract

Complex legal issues have been brought up by the quick growth of commercial space operations, especially when armed conflict is involved. The international legal ideal of neutrality is under tremendous pressure as private organizations like satellite operators, launch service providers, and communications companies become increasingly involved in military activities. The law of neutrality, which tries to restrict the operational and geographic reach of war, has historically governed the rights and obligations of nations that do not take part in armed conflict. However, there are urgent concerns regarding the applicability of neutrality standards to non-state players operating in the space domain given the role of commercial actors in delivering essential space-based services including satellite imaging, communication links, and navigation support. With an emphasis on legal ambiguity, state responsibility, and the defense of neutral interests, this study investigates how the current framework of the law of neutrality applies to commercial space operators during armed conflicts. It looks at the ramifications of using private enterprises' services to support military operations and whether they can be regarded as "neutral" in the conventional sense. The study is based on legal doctrine, state practice, and previous conflicts where commercial satellites were clearly used for communication and intelligence gathering, such as the Iraq War, the Afghanistan War, the Syrian Civil War, the Nagorno-Karabakh conflict, and the Russia-Ukraine conflict. Although neutrality legislation was initially created for terrestrial and maritime situations, the article contends that its concepts are still applicable in space, albeit with considerable modification. It argues that governments have a duty to make sure businesses operating under their control abide by international law and refrain from taking any activities that would jeopardize their neutrality or make them vulnerable to legitimate attack. Additionally, it demands more precise regulatory guidelines and possibly new legal tools to address the changing

role of commercial space actors in contemporary conflict while striking a balance between legal accountability, commercial viability, and innovation.

Keywords

The Neutrality Law, Commercial Space Actors, Space Safety, Armed Conflict, Satellites, Military Actions, State Responsibility

1. Introduction

Space has supported military activities on Earth since the dawn of the space age. Space assets have been used by governments for many years. Beyond applications in defense and national security, space technologies are especially well-suited to handle many threats and hazards that are technical, sociological, and natural. They enable the collection of vital data, offer accurate navigation tools, create backup telecommunications hubs when necessary, and provide early warning through earth observation applications (OECD, 2022). Since 1991, satellite communications, photography, and navigation have been crucial elements in space conflicts across the globe. The foundation of international space law remains the 1967 Outer Space Treaty (OST), which places a strong emphasis on the peaceful use of space. Article IV of the OST specifically prohibits the launching of nuclear and WMD weapons into orbit and limits military actions on celestial bodies.

The pact does not completely address the use of space-based resources, like satellites for reconnaissance and communication networks, in terrestrial warfare. International law has faced additional difficulties as a result of the conflict such as the Syrian Civil War, Russia and Ukraine War, and the Nagorno-Karabakh conflict especially in relation to the militarization of space. A fundamental tenet of international space law, the neutrality of space, is coming under unprecedented examination as countries use sophisticated satellite technology for communication, intelligence, and strategic operations. With an eye toward global security and governance, this study explores the ways in which the conflicts have impacted the legal definition of neutrality in space. It examines the legal frameworks controlling space neutrality, examines the use of space assets during the conflict, and talks about the wider ramifications for the peaceful use of space.

2. Armed Conflict and Purpose of Neutrality

The use—or threat—of military capabilities in outer space to obtain a strategic edge is known as space warfare. Although there hasn't been a formal conflict fought solely in space, from the middle of the 20th century, space has become more militarized and potentially weaponized. The origins of space warfare can be seen in early reconnaissance satellites, Cold War rivalry, and the growing reliance on space infrastructure in traditional conflicts rather than in science fiction conflicts.

In 1962, President John F. Kennedy, speaking at Rice University, warned:

“We set sail on this new sea because there is new knowledge to be gained, and new rights to be won, and they must be won and used for the progress of all people. For space science, like nuclear science and all technology, has no conscience of its own. Whether it will become a force for good or ill depends on man, and only if United States occupies a position of pre-eminence can we help decide whether this new ocean will be sea of peace or new terrifying theater of war. I do not say that we should or will go unprotected against the hostile use of land or sea, but I do say that space can be explored and mastered without feeding the fires of war, without repeating the mistakes that man has made in extending his writ around this globe of ours.” (Kennedy, 1962)

It is inevitable that the integration of space-based capabilities into air, sea, and ground warfare will proceed at a swift pace. The deployment of new combat systems that depend on space capabilities will cause this to occur both vertically and horizontally as more countries join the space age military. Space could potentially be used as a communication route thanks to technologies like the Hypersonic Space Vehicle, which can move across space while transporting people and goods (DARPA, 2005).

The concept of armed conflict in space originated in the 1990s when the military services of several countries agreed that significant space technologies are a part of contemporary combat. The first Gulf War relied heavily on space-based assets to support alliance operations on Earth, even though it wasn't physically fought in space. As a result, many people believe that the Gulf War was the first “space war” that was actually legitimate (Anson & Cumming, 1991).

The first instance of space being used for military purposes was in the 1960s, when the United States and Soviet Union launched spy satellite. These satellites played a crucial role in intelligence gathering during the Cold War (Preston, 1994). The earliest space warfare technologies were anti-satellite (ASAT) weapons. In 1985, the U.S. successfully tested an ASAT system by destroying a satellite using a missile launched from an F-15 fighter jet (Richelson, 1999). Russia (formerly the Soviet Union) developed co-orbital ASAT systems, capable of intercepting and damaging foreign satellites. China's 2007 ASAT test, which destroyed its own weather satellite, marked a new era of space tension due to the high amount of orbital debris it created (Samson, 2020).

With regards to the law of neutrality, it was during the Middle Ages when neutrality first appeared as a legal term (Hornblower et al., 2012). States usually depended on their neutral status to keep them out of unwelcome conflicts when wars were still viewed as acceptable means of managing international affairs (Vagts, 1998).¹ War is localized, its conduct is restricted on land and at sea, and its effects are mitigated by the code of neutrality (Williams, 1980; Norton, 1976; Dinstein,

¹Chadwick, E. (2002). Traditional neutrality revisited: Law, theory and case studies. Kluwer Law International.

1994).² The law of neutrality still plays a significant role in preventing the violence from spreading, controlling how belligerents behave toward non-conflicting countries, controlling how neutrals behave toward belligerents, and lessening the negative impact of such conflicts on global trade (McNeill, 1991; Robertson, 1991).

Neutrality in international law traditionally refers to the rights and obligations of states that remain impartial during armed conflict. Historically codified through treaties such as The Hague Conventions of 1907, the law of neutrality has sought to balance the interests of belligerent states and non-belligerent entities. However, the extension of these principles to outer space presents significant challenges.

3. Obligations under Outer Space Treaty and Traditional Neutrality Law

The foundational legal instrument governing outer space is the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, commonly referred to as the Outer Space Treaty (OST). This treaty prohibits the placement of nuclear weapons or any other weapons of mass destruction in orbit or on celestial bodies and mandates that the Moon and other celestial bodies be used exclusively for peaceful purposes.

However, the OST does not prohibit the use of space for military purposes *per se*. It permits the use of military personnel, equipment, and support systems, *provided* they are not engaged in activities contrary to the treaty's peaceful purposes clause. As such, while the OST promotes non-aggression and cooperation, it does not enshrine the principle of neutrality as understood in terrestrial international humanitarian law.

In times of armed conflict, the general principles of international humanitarian law (IHL) would still apply in outer space. IHL requires distinction between civilian and military targets, proportionality in the use of force, and the protection of non-combatants. However, the dual-use nature of many space assets—where civilian satellites may also serve military functions—makes it difficult to clearly categorize objects in space as either military or civilian. This dual-use challenge raises complex questions about the application of neutrality, particularly when non-belligerent states' assets are used by or benefit one side in a conflict.

Moreover, the traditional legal concept of neutrality obliges neutral states to abstain from participation in armed conflict and prohibits belligerents from conducting hostilities on the territory of neutral states. Translating these principles to space is problematic, as space is considered as global commons not subject to national sovereignty. The prohibition on national appropriation in Article II of the OST means that there is no sovereign territory in space that could be considered

²McDougal, M. S., & Feliciano, F. P. (1961). *Law and minimum world public order: The legal regulation of international coercion*. New Haven Press.

“neutral” in the same sense as on Earth. Furthermore, in the absence of clear jurisdictional boundaries and with the proliferation of privately owned space assets, the enforcement of neutrality norms becomes even more ambiguous.

In recent years, geopolitical tensions have escalated concerns over the potential weaponization of space. Nations such as the United States, Russia, China, and India have demonstrated anti-satellite (ASAT) capabilities, raising the specter of space as a domain of conflict. These actions threaten not only the security of the targeted assets but also the broader space environment, as debris generated from ASAT tests can endanger other, potentially neutral, satellites. In such an environment, the practical meaning of neutrality becomes difficult to sustain.

Efforts to establish clearer rules include United Nations resolutions such as the Prevention of an Arms Race in Outer Space (PAROS), and initiatives like the European Union’s proposed Code of Conduct for Outer Space Activities. However, these instruments remain non-binding and lack enforceability. Proposals by Russia and China for a Treaty on the Prevention of the Placement of Weapons in Outer Space have failed to gain consensus, largely due to disagreements over definitions and verification mechanisms.

By preventing neutral states from participating in military conflicts, the law of neutrality aims to keep the belligerents and neutral states amicable (Oppenheim, 1912), while enabling the continuation of international trade and commerce (Nasu, 2020). The law of neutrality entails certain obligations and rights in the relationship between States involved to an international armed conflict and neutral States.³ The law of neutrality serves a number of fundamental purposes in this context, including shielding neutral states from the negative consequences of armed conflict, shielding belligerent states from neutral state actions that would favor their enemies, and discouraging states from engaging in armed conflict in order to stop it from getting worse (Dinstein, 2016).

The concept of neutrality, rooted in centuries-old international law, faces significant challenges when applied to the unique and evolving domain of outer space. As states and private entities increasingly rely on space assets for both civilian and military purposes, questions about the applicability of neutrality principles have come to the forefront.

The legal framework for neutrality in outer space is underpinned by both traditional neutrality principles and space-specific treaties. The Hague Conventions emphasize the rights of neutral states to avoid being drawn into conflicts, while imposing restrictions on belligerents’ use of neutral territory. Although these principles were designed for terrestrial conflicts, they provide a basis for interpreting neutrality in outer space.

The Outer Space Treaty, which continues to be the cornerstone of space law, forbids the placement of Weapons of Mass Destruction, encourages the peaceful

³Antonopoulos, C. (2022), Australian Defence Headquarters. (2006). ADDP 06.4, Law of armed conflict, Bothe, M. (2015). Neutrality, concept and general rules. In R. Wolfrum (Ed.), *Max Planck Encyclopedia of Public International Law*.

use of space, and states that national appropriations cannot be used in outer space. Nevertheless, it leaves opportunity for interpretation and discussion because it has no clear requirements addressing neutrality during armed conflicts. The legitimacy of employing space assets for military purposes during conflicts is called into doubt by the lack of specific advice on neutrality in space law, particularly when those assets are owned by neutral nations or commercial entities.

4. The Conflicts and Space Neutrality

While the Syrian Civil War, which started in 2011, did not involve direct military operations in space, it did highlight how the use of space-based assets by foreign actors can raise issues of neutrality in space. Although the war did not involve satellite weapons or kinetic action in space, it did heavily rely on space-based navigation, communications, and surveillance systems, many of which were run by commercial actors or third-party states.

These uses raise concerns about the application of neutrality law in the space domain, as different foreign states, including the United States, Russia, the United Kingdom, and France, conducted military operations against various adversaries (e.g., ISIS, Syrian government forces, or opposition groups). These military operations heavily relied on space-based resources, including high-resolution imagery from commercial providers like Maxar Technologies, Planet Labs, and Digital-Globe for military planning and public reporting of suspected war crimes, and navigation and weapon guidance systems like the GPS constellation used by the United States and its coalition partners.

One particularly challenging issue for neutrality is the use of commercial satellites. For instance, one party in the conflict may receive communication or images services from a commercial satellite operator situated in a neutral state. It might be argued that this support violates the neutrality principle if it materially improves a belligerent's ability to fight wars.

The Syrian Civil War illustrated the growing fuzziness of the distinction between the military and humanitarian use of satellite technology. Through its UNOSAT program, the United Nations Institute for Training and Research (UNITAR) evaluated displacement, documented possible war crimes, and tracked damage to civilian infrastructure using commercial satellite photography. Even while these initiatives are meant to aid international humanitarian law enforcement, they may unintentionally sway political reactions and public opinion, which would have an indirect impact on the dynamics of the conflict (UNOSAT, 2016).

Another element includes ground stations and relay infrastructure. Neutral states hosting such infrastructure may inadvertently support belligerent actions if their territory is used to downlink satellite data or communicate with assets utilized for military reasons. The problem of control and attribution under international law is made more difficult by the expanding global presence of satellite ground stations, particularly those run by commercial or multinational organizations.

The Syrian Civil War brought to light serious difficulties for the application of neutrality legislation in the space domain, despite the fact that it did not entail space weaponry or direct military attacks in outer space.

It illustrated the necessity of adjusting traditional neutrality principles to a world where space infrastructure is decentralized, dual-use, and globally interconnected, as well as the growing reliance on space-based assets for both military and humanitarian purposes. Commercial actors also played a significant role. Both national and international legal systems need to change to handle these difficulties because it is likely that future wars will continue to use space assets.

At the same instance, Russia's conflict with Ukraine, which began on February 24, 2022, has been dubbed the first "two-sided space war" (Beale, 2022). With connections to other hybrid threat domains, the space domain has been exploited in a way that is increasingly adaptable and dynamic. The significance of private and commercial resources in the use of the space domain has been emphasized in particular, and the war has caused significant setbacks for international space cooperation. China and Russia are working on electronic and cyber weapons as well as anti-satellite capabilities (Burbach, 2022).

While Western nations are coming up with space plans and reevaluating their security missions. The partnerships and collaboration in the space domain are shaped by dual-use capabilities, novel space phenomena, evolving space dangers, and the growing importance of space-based capabilities to the essential functioning of society. However, in order to effectively manage space operations and security, the current global space governance structure is insufficient (Skibba, 2022).

Discussions about military usage of space typically center on satellites themselves. The conflict between Russia and Ukraine demonstrated how important satellites are to contemporary warfare and how governments will use counterspace technologies to target satellites. The conflict has also demonstrated that the usage of satellite capabilities will vary depending on the nature of the conflict. Discussions about military usage of space typically center on satellites themselves.

But because of satellite ground systems, satellite data processing software, decentralized information exchange, and innovative applications of data from existing satellite capabilities by forces on the ground, the value and use of space has transformed, especially for Ukraine and its coalition. Lessons learned from Russia's war in Ukraine should also include the importance of space doctrine, information-sharing protocols, and ground-based enabling segments beyond the satellites, whether government-owned or commercial, as evidenced by the lackluster outcomes of its initial, purported space superiority (Dickey & Gleason, 2024).

Lessons about how the conditions of the war affect the use of new satellite and anti-satellite technologies can also be learned from the ongoing conflict. The impact of military capabilities depends on the war strategy as well as their operational and technical characteristics. Russia's assault against Ukraine has exposed numerous vulnerabilities of space infrastructure components.

The primary military functions of satellites are intelligence, surveillance, and

reconnaissance (ISR); communication; and positioning, navigation, and timing (PNT) (U.S. Defense Intelligence Agency, 2022). ISR satellites locate enemy installations and military units using a range of sensors, including radars and cameras. ISR satellites are also used by the military for tasks like weather monitoring, mapping, and missile warning. Long-distance communications for information sharing and action coordination are made possible by communications satellites. (Wilgenbusch & Heisig, 2013).

The military is increasingly targeting private satellites. Russia has raised fears about possible assaults on private space systems by implying that it may see commercial satellites that support Ukraine as legitimate military targets. There is a greater chance of escalation and space-based warfare in conflict areas when commercial space assets are not clearly protected by the law.

Private space firms will likely continue to be essential to modern warfare, according to the pattern set by the conflict between Russia and Ukraine. This calls into question how private participants in conflicts are governed and regulated. Should governments give private space businesses more stringent regulations? Should guidelines for the use of commercial space assets in war be established by new international treaties? To stop future conflicts from spreading into space, these urgent challenges must be resolved, and specialists in space law and international relations.

The dual-use nature of these space technologies presents challenges for international law, as satellites used for environmental monitoring or telecommunications can also serve military purposes without changing their hardware, making it difficult to establish intent and responsibility. This ambiguity strains the current legal framework, which lacks enforceable mechanisms to prevent the covert or commercial militarization of space during regional conflicts like Nagorno-Karabakh. By using geospatial intelligence, real-time surveillance, and satellite communications by both sides, as well as entities supporting them, the lines between military and civilian space use have been blurred, making it more difficult to apply traditional neutrality principles in the modern space environment.

Further complicating the neutrality framework was the growth of commercial satellite communications and Earth observation firms, such as Intelsat, Iridium, and GeoEye, whose data and bandwidth were contracted by the U.S. Department of Defense. Article VI of the 1967 Outer Space Treaty says that all national actions in space, including those carried out by non-governmental organizations, are subject to international accountability. States that hosted these private corporations may therefore have been held indirectly accountable for their involvement in the wars.

Although the U.S. Department of Defense Law of War Manual and the Law of Armed Conflict (LOAC) acknowledge neutrality as a legally binding concept, they also provide reasonable exceptions in the context of multilateral operations, coalitions, and counterterrorism (U.S. Department of Defense, 2016). As a result, some academics, including Elizabeth Chadwick and Detlev Vagts, contend that

the traditional neutrality framework has been significantly undermined in the post-9/11 era due to new technologies and broader definitions of security threats (Vagts, 1998).

The International Security Assistance Force (ISAF), which was led by NATO and included contributions from supposedly neutral states under humanitarian or reconstruction mandates in Afghanistan, was deeply integrated into a military structure and relied on shared satellite and surveillance infrastructures, making the application of neutrality laws even more difficult (Heinegg, 2007).

Also, international internet infrastructure and satellites, which were hosted and run by non-belligerent states, frequently facilitated cyberwarfare, which was arguably launched from both inside and outside of the fighting zones. Jeffrey Kelsey claims that as it becomes more difficult to distinguish between civilian and military digital assets, this new reality calls into question the norms of distinction and neutrality found in international humanitarian law (Kelsey, 2008).

In a world of interconnected space and cyber systems, the conventional notion of neutrality—which depends on physical borders and clearly defined state responsibilities—is becoming antiquated, as the wars in Iraq and Afghanistan show.

5. Neutrality and Jus in Bello in Space

Neutrality and jus in bello are two important concepts in international law that govern the behavior of nations and parties during armed conflict. Neutrality refers to the legal position of a state that abstains from participation in conflicts with other states (Geneva Conventions, 1949). While neutral states are entitled to protection of their territorial integrity and freedom from attack under The Hague Conventions of 1907 and customary international law, they must also refrain from engaging in military activities, such as supplying troops, weapons, or direct logistical support.⁴

In contrast, all participants to a conflict are subject to jus in bello, the law guiding the conduct of war, regardless of whether the conflict is considered lawful (Heintschel von Heinegg, 2012). Its foundations lie in the Geneva Conventions of 1949 and their Additional Protocols, which aim to limit the effects of armed conflict on people and property (ICRC, 2005). Distinction (between combatants and non-combatants), proportionality (avoidance of disproportionate force), necessity (using only what is necessary to achieve legitimate military aims), and humanity (prohibiting unnecessary suffering) are the fundamental tenets of jus in bello (ICJ, 1996).

Reducing the suffering of combatants and preventing attacks on civilians are the goals of international humanitarian law (Oppenheim, 1992). The interaction between neutrality and jus in bello is especially complex in modern conflicts involving cyber and space domains. For instance, satellite services provided by neutral states or commercial companies may support military operations, potentially

⁴Hague Convention (V) respecting the rights and duties of neutral powers and persons in case of war on land. (1907). *Convention V*, Articles 1-8.

endangering their neutral status or making their assets lawful military targets (Schmitt, 2017). This raises pressing legal and ethical questions, especially since most existing treaties, including the Outer Space Treaty of 1967, were not designed to address private sector involvement in armed conflict (Outer Space Treaty, 1967).

As the nature of warfare evolves—with new technologies, non-state actors, and dual-use infrastructure—the interpretation and enforcement of neutrality and *jus in bello* must adapt accordingly. This may require the development of new legal norms or the clarification of existing international humanitarian law to ensure that both principles remain effective in protecting civilians and preserving impartiality during conflict (Duxbury & Gro Nystuen, 2021).

6. Neutrality and *Jus ad Bellum* in Space

The principle of *jus ad bellum* governs the legality of the resort to force by states, and is foundational in regulating acts of war under the United Nations Charter (Brownlie, 2008). In outer space, *jus ad bellum* intersects with the principle of neutrality, raising complex legal challenges given the dual-use nature of space assets and the growing involvement of both state and non-state actors in this domain.

Under Article 2(4) of the UN Charter, the use of force by states is prohibited, except in cases of self-defense (Article 51) or with Security Council authorization (Brownlie, 2008). The Outer Space Treaty (OST) of 1967 reinforces this by declaring that space shall be used “for peaceful purposes” and that the Moon and other celestial bodies shall be free from the placement of weapons of mass destruction. However, the OST does not explicitly prohibit all forms of military activity in space, leading to ambiguity in how *jus ad bellum* is applied in outer space contexts (Jakhu, Pelton, & Nyampong, 2017).

Neutrality in space becomes particularly strained when a neutral state operates or hosts commercial space infrastructure that provides services—such as satellite imagery or communication—to belligerent parties (Tziolas, 2020). According to traditional neutrality law, a neutral state must not allow its territory to be used for acts of war. However, in space, where orbits are globally shared and satellites serve multiple users across borders, enforcing these principles becomes significantly more complex (Hitchens, 2022).

Furthermore, cyber operations targeting satellites, ground stations, or command-and-control infrastructure challenge traditional notions of an “armed attack”, which is the threshold for lawful self-defense under *jus ad bellum* (Schmitt, 2017). If a cyberattack disables a military satellite without causing physical destruction or loss of life, it remains debated whether this constitutes a use of force triggering Article 51 of the UN Charter (Droege, 2012). In this uncertain environment, calls have been made to clarify how *jus ad bellum* applies to actions taken in or through space. Proposals include revising space governance frameworks, adopting confidence-building measures, and establishing clearer norms on attrib-

ution, proportionality, and necessity in the context of space-based attacks (UNODA, 2021).

Ultimately, maintaining neutrality and respecting *jus ad bellum* in space requires international consensus and updated legal tools that reflect current geopolitical and technological realities.

7. Self Defense and Neutrality

One of the most fundamental rules of international law is that States are prohibited from using force to resolve their international disputes. Any State that uses force against the territorial integrity or political independence of another State violates this solemn rule of international law.

Article 2(4) of the United Nations Charter prohibits the threat or use of force against the territorial integrity or political independence of any state (United Nations, 1945).

A clear example is Russia's actions which have been widely condemned as a violation of this fundamental norm. Russia has claimed self-defense and humanitarian intervention as justifications for its invasion of Ukraine (Russian Federation, 2022). However, these arguments have largely been rejected by the international community (Akande et al., 2022). The International Court of Justice (ICJ) in its March 2022 provisional measures ordered Russia to immediately suspend military operations, indicating that the legal basis provided did not meet the threshold for lawful use of force (International Court of Justice, 2022).

The United Nations General Assembly, through multiple resolutions—including ES-11/1 and ES-11/6—has reaffirmed Ukraine's sovereignty and condemned Russia's use of force as unlawful (United Nations General Assembly, 2022, 2023). These resolutions emphasize the principle of non-intervention and reinforce that no state may use force to settle territorial disputes or exert political influence over another state.

The war has tested the applicability of collective self-defense under Article 51 of the UN Charter. Ukraine has invoked this right, and many NATO and EU member states have responded by supplying arms, intelligence, and financial support without becoming direct parties to the conflict. This reflects the evolving landscape of indirect involvement and raises questions about the threshold for direct participation in hostilities under international law.

There are also concerns over the disproportionate and indiscriminate use of force, especially in densely populated civilian areas such as Mariupol, Kharkiv, and Bucha (Human Rights Watch, 2022). These incidents could potentially amount to war crimes or crimes against humanity under international humanitarian law and the Rome Statute of the International Criminal Court (ICC) (Rome Statute of the International Criminal Court, 1998).

Moreover, the war has spurred debates about hybrid warfare, cyber operations, and the weaponization of energy resources—all of which challenge traditional understandings of the use of force and the scope of lawful self-defense (Schmitt,

2023). These developments call for a broader interpretation of the UN Charter's provisions to address non-traditional and emerging threats.

Applying this rule, the use of force by Russia against Ukraine is an escalation of a dangerous situation threatening international peace and security that violates the prohibition of the use of force under international law. Russia's action is ostensibly an act of aggression against another sovereign State. Unfortunately, it is also a stark reminder of the many violations of international law over the past fifty years that have been committed by other states, especially the United States and its allies, and the impotence of the United Nations.

While the situation is still fluid and the extent of violation of international law remains to be determined, it would seem undisputed that the bombing of military sites within Ukraine—not necessarily in Donetsk and Luhansk—is contrary to article 2, paragraph 4 of the Charter of the United Nations (UN Charter), that prohibits the use of force against the territorial integrity or political independence of Ukraine. So is the movement of Russian military into Ukraine and their engagement in armed hostilities.

Under the 1996 Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons, the International Court of Justice interpreted that if Ukraine's "survival is at stake", then perhaps even nuclear weapons could be used. Ukraine has the right to respond to an armed attack and to seek the aid of other states to aid in its self-defense. Ukraine may take all proportionate measures to repel Russia's attack.

In the context of outer space, where the militarization and strategic importance of space assets have increased, the invocation of self-defense may significantly constrain the practice of neutrality since it permits a state to take necessary and proportionate actions in response to an armed attack, including retaliatory measures in outer space. The principle of neutrality in international law traditionally requires non-participating states to refrain from supporting or participating in hostilities between belligerent parties, but it is not absolute and may be limited by the inherent right of self-defense, as recognized in Article 51 of the United Nations Charter.

If a state's space assets—such as satellites used for communication, navigation, or surveillance—are targeted or if those assets are critical to national security, this right may take precedence over the duty to maintain neutrality. For example, if a satellite is disabled by an anti-satellite (ASAT) weapon from another state, the affected state may claim a right to respond, including with force in space, thereby renouncing its neutral posture (United Nations, 1945).

A state may claim that safeguarding its commercial satellites or cyberinfrastructure connected to space operations is an act of self-defense, even if those systems have not yet been directly attacked, because the nature of modern warfare, especially in hybrid conflicts involving space-based technologies, frequently blurs the line between offensive and defensive actions. Many commercial and dual-use space technologies serve both civilian and military purposes (Jakhu & Pelton, 2017).

The lack of a strong international enforcement mechanism makes it difficult to distinguish between legitimate acts of self-defense and covert support to a belligerent party under the pretext of neutrality, which can lead to increased suspicion, space-based escalation, or retaliatory actions that further subvert the principle of neutrality in space. This preemptive or preventive application of self-defense can undermine a state's objective neutrality, particularly if it seems to favor one side in an international conflict.

8. The Impact of Conflicts on Neutrality Law

Neutrality, a fundamental principle of international law, has been used historically in both land-based and maritime conflicts. Absence from hostilities is emphasized in the Hague Conventions of 1907, which establish the rights and obligations of neutral governments. It is challenging to apply these ideas to space, nevertheless, due to the unique legal and technological landscape. Satellite technology, commercial space assets, and cyberwarfare have altered the traditional understanding of neutrality, as seen by the conflict between Russia and Ukraine.

The afore-mentioned conflicts have sparked important debates about the legal frameworks controlling space operations and the significance of space in modern conflicts. International space law is still based on the 1967 Outer Space Treaty (OST), which promotes the peaceful use of space. The launch of nuclear and WMD weapons into orbit is specifically prohibited by Article IV of the OST, which also limits military actions on celestial bodies. However, the pact does not completely address the use of space-based resources, like communication networks and surveillance satellites, in terrestrial warfare. This ambiguity has made it challenging to maintain space neutrality from a legal and geopolitical perspective conflicts crisis.

As private companies get more involved in space-based services like satellite communications and remote sensing, questions are raised about their obligations under international law. Secure communication networks and real-time satellite imagery from private companies like SpaceX (Starlink), Maxar Technologies, and Planet Labs have been advantageous to Ukraine (Weeden, 2022). These resources have been essential for tracking troop movements, planning military strategies, and maintaining communication in conflict-affected areas (Kristensen et al., 2023). Russia allegedly launched cyberattacks against commercial satellite networks, including Viasat's KA-SAT system, to obstruct Ukrainian military communications (Barnes, 2022).

Article IV of the Outer Space Treaty states:

“States Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner. The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations, and fortifications, the testing of any

*type of weapons, and the conduct of military maneuvers on celestial bodies shall be forbidden. The use of military personnel for scientific research or other peaceful purposes shall not be prohibited.*⁵

This clause highlights the concept of non-militarization of space by prohibiting the establishment of military installations on celestial planets and limiting the deployment of WMDs. However, it does not expressly prohibit the use of conventional space-based resources, including satellites, for military purposes during Earthly conflicts. This legal loophole has allowed states and private companies to employ space technologies in ways that violate the ideal of space neutrality.

The fact that space technology is dual-use greatly hinders the implementation of neutrality in outer space. The use of satellites and other space-based resources is difficult to classify as neutral or belligerent because they are often used for both military and civilian purposes. For example, communication satellites that facilitate military communications while also supporting humanitarian initiatives may blur the line between neutral and non-neutral actions. This involvement of the business sector complicates the issue.

Space is being militarized or weaponized by commercial interests. The Outer Space Treaty does not forbid the development of conventional weapons in space, even while it forbids the stationing of nuclear and other WMDs in orbit or on celestial bodies. Commercial enterprises that create and implement dual-use (military and civilian) technologies run the risk of unintentionally or purposely fueling wars. For example, governments may exploit tracking devices, communications infrastructure, or satellite imaging from private satellite businesses for military objectives. The commercial enterprises' involvement in military operations in space could violate neutrality since it could support one side of a conflict, even though their intentions may be benign (i.e., offering services for lawful civilian reasons).

The absence of robust international legislation and control is one of the main issues surrounding commercial actors' violations of neutrality. The growing number of private commercial entities makes it more difficult to guarantee neutrality, even if international law offers a framework for the peaceful use of space. The responsibility for maintaining space as a neutral area rests on national space agencies and international organizations such as the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). Many commercial players, however, function outside of these frameworks or under national laws that do not place a high priority on space neutrality. It is challenging to hold commercial players responsible for neutrality infractions in the absence of legally binding international legislation on space trade.

Commercial and state-owned space assets are exploited in military operations, blurring the lines of neutrality. Because Ukrainian military communications use Starlink and rely on Western satellite imagery for targeting, there are questions

⁵Treaty 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), 1967.

regarding whether these actions constitute a breach of neutrality. While private companies are not bound by the same neutrality rules as states, their governments may face diplomatic or legal consequences if they allow their assets to be used in a war.

Another issue is the exploitation of space resources for military purposes. As commercial companies begin to mine space, concerns are raised that these resources could be utilized for military purposes. For example, a commercial mining company may violate neutrality if it uses resources from the Moon or asteroids to develop military technologies (e.g., fuel for space-based weaponry). The Moon Agreement of 1979 and the Outer Space Treaty seek to regulate the peaceful use of celestial bodies, but as commercial space exploration and resource extraction gain impetus, it's critical to ensure that these activities aren't diverted for military objectives.

Despite the fact that state actors have historically been seen as neutral, the use of these standards is being called into question due to belligerents' growing reliance on commercial space services during conflicts. Moreover, enforcement measures are still insufficient. Space lacks strong systems to oversee and enforce adherence to neutrality norms, in contrast to terrestrial areas. It is more difficult to hold people accountable for infractions when there is no centralized regulatory agency with enforcement power.

The difficulties in upholding neutrality norms in space have been brought to light by conflicts such as the Syrian Civil War and the Russia Ukraine War. There have been concerns regarding the impartiality of private corporations' satellite imaging and communication services because they have been essential in assisting military operations.

Such actions jeopardize the space environment's security and sustainability, with consequences that extend beyond the ongoing battle. Governments' differing interpretations of their neutrality responsibilities as a result of unclear legal advice have also led to inconsistencies in the application of international law.

9. The Complications of Qualified Neutrality and Non-Belligerency

According to international law, a state's legal standing as an impartial participant during armed conflicts is known as "traditional neutrality". Due to the dual-use nature which refers to any technology, product, or system that can be used for both civilian and military purposes of space technologies and the participation of commercial enterprises, neutrality is not absolute in the outer space realm. As a result, the idea of qualified neutrality was born, acknowledging that although governments may aim to maintain their neutrality in space-related conflicts, they may still indirectly promote them through scientific and commercial means.

Qualified neutrality refers to a modified or conditional form of neutrality where a state maintains a non-belligerent status in an armed conflict but does not fully abstain from supporting one side, often through indirect means such as permit-

ting certain military or commercial activities that may benefit one party. In traditional international law, this concept contrasts with absolute neutrality, where a neutral state must refrain from any support that could influence the outcome of a conflict.

The concept of qualified neutrality recognizes that the use of space-based resources can influence the course of a conflict even when a state's military is not directly involved.

Space-based assets run by privately held corporations registered in neutral states are not specifically covered by the OST's traditional neutrality standards, which prohibit neutral nations from permitting military operations on their soil (UNOOSA, 2023). Both legal and policy issues are brought up by the qualified neutrality principle in space. In conventional conflict, the Geneva and Hague Conventions do not address every facet of neutrality. In response, there have been demands for new legal frameworks that address the role of private corporations in armed conflicts and make clear states' obligations under international space law (European Space Agency, 2022).

Despite attempts by international bodies like the Conference on Disarmament and the United Nations Office for Outer Space Affairs (UNOOSA) to establish more precise criteria for neutrality in space, agreement remains elusive due to geopolitical concerns and technological improvements (Conference on Disarmament, 2023). Future legal frameworks must take into account the definition and application of neutrality in space, especially with regard to the exploitation of resources based in space and the participation of commercial organizations in disputes on Earth. Without such updates, the ambiguity of qualified neutrality could be further exploited, increasing global tensions and possibly sparking space wars.

10. The State and International Responsibility

While traditional neutrality law was created for land, air, and maritime conflicts, the increasing reliance on space-based assets in armed conflict necessitates that the principle of state responsibility be extended and adapted to this domain. Traditional neutrality law faces new challenges as space becomes an increasingly important arena for military and strategic operations.

State responsibility in space refers to the legal obligation of states to ensure that their activities in outer space, including those conducted by private or non-governmental entities, comply with international space law. This principle is primarily grounded in the Outer Space Treaty of 1967, which establishes that states bear international responsibility for national space activities, whether conducted by governmental or non-governmental actors. This responsibility includes ensuring that activities are carried out in conformity with the provisions of the Treaty, including the obligation to use outer space for peaceful purposes and to avoid harmful contamination.

States, whether they are commercial or public, are held internationally accountable for their national operations in space under the 1967 Outer Space Treaty

(OST). According to Article VI of the treaty: “*States Parties to the Treaty shall bear international responsibility for national activities in outer space... whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty.*” This clause serves as the foundation for the application of state accountability to non-state and commercial activities that could jeopardize a state’s neutrality.

A neutral state must not permit the use of its resources, territory, or services to aid belligerents in an armed war, according to the law of neutrality, which is supported by the Hague Conventions of 1907. While states have jurisdiction and control over their space objects, ground-based infrastructure, and commercial operators, they do not have sovereignty over space or celestial bodies. Therefore, a neutral state has a duty to stop any party to an armed conflict from using its space assets, whether they are privately or publicly owned, to support military activities. The link between commercial space activities and the neutral state is crucial in determining whether the neutrality law is applicable.

In contemporary conflicts, where commercial satellite constellations offer geo-location data, encrypted communications, and real-time pictures, this duty is especially pertinent. Businesses such as Maxar Technologies and SpaceX (Starlink) supplied Ukraine with broadband communications and high-resolution satellite imaging during the Russia-Ukraine conflict. Even if private actors provided these services, their home states—such as the US—may be held indirectly liable if they approved, encouraged, or neglected to control such participation (Gilli, 2023).

This is further supported by Article VII of the OST, which states that a launching state is “*internationally liable for damage to another State Party... caused by its space object or by the component parts thereof on the Earth, in air space or in outer space.*” While liability here refers primarily to physical damage, it intersects with the broader principle of due diligence in preventing harm caused by space objects used for hostile purposes.

“A neutral Government is bound to employ the means at its disposal to prevent the fitting out or arming of any vessel within its jurisdiction which it has reason to believe is intended to cruise or engage in hostile operations, against a Power with which that Government is at peace” (Hague XIII, Article 8 treaty law does not require) and neutral states are prohibited from giving belligerents “ammunition, or war material of any kind whatsoever.”

Nonetheless, neutral states do not have to forbid private businesses from selling weapons and supplies. Lawful help by private individuals or private businesses in a neutral state is distinguished from unlawful assistance by the neutral state by the customary rule of neutrality. Yet, further thought must be given to whether and to what degree military telecommunication or remote sensing services for the belligerent may be classified as “war materials,” or whether they could be classified as “export” or “transit.” This needs to be investigated individually.

States have a lot of responsibilities under five multilateral treaties that were

drafted in a span of twelve years. All of these multilateral conventions mandate that states respect international law, take accountability and liability for their actions (whether governmental or non-governmental), permit and oversee their citizens' space activities, and report their space activities to the UN, the public, and the scientific community (Hermida, 2004).

The United States encouraged the participation of private parties in the Outer Space Treaty negotiations (Johnson, 1963). However, the Soviet Union opposed this plan, stating that only states should engage in space endeavors.⁶ In the end, Article VI of the Outer Space Treaty was written to permit private space operations as long as the relevant State maintains authorization and ongoing oversight over its non-governmental organizations (Von der Dunk, 2008). The State is held accountable for all national operations, including those carried out by private entities.

Authorization is typically accomplished through the creation of a licensing system, and regulatory oversight is used for supervision following license issuance. Among other things, the 1967 Outer Space Treaty mandates that states conduct space operations in conformity with international legal norms⁷, "States bear international responsibility for national activities in space, on the moon, and on celestial bodies, including activities of both governmental and non-governmental entities,

The "appropriate State" (Lee & Steele, 2014) must approve and oversee its citizens' space activities.⁸ If a State launches an object into the air or space, (b) the State procures the launch for said object, or (c) the object is launched from the State's territory or facility, the State is held internationally liable for any harm the object causes to another State or its national or juridical persons.⁹

An object and any personnel on it shall remain under the sovereignty and control of the states whose register it is launched on,¹⁰ and States must prevent the introduction of alien matter from causing hazardous contamination and negative environmental effects; if a State thinks that an experiment or activity it or its citizens are conducting in space could endanger or obstruct the activities of other States in space, it must first confer with those States;¹¹ and States are required to report the "nature, conduct, locations, and results" of their space activities to the U.N. Secretary General.¹²

Furthermore, a state is accountable for the actions of private individuals or organizations if it has directed or controlled such behavior, or subsequently recognized and accepted it as its own, in accordance with the Draft Articles on the Responsibility of States for Internationally Wrongful Acts (2001). Therefore, failure

⁶United Nations Committee on the Peaceful Uses of Outer Space. (1963, September 13). 22nd meeting (U.N. Doc. A/AC.105/PV.22

⁷Outer Space Treaty, supra note 1, art. III.

⁸Outer Space Treaty, supra note 1, art. VI

⁹Outer Space Treaty, supra note 1, art. VII.

¹⁰Outer Space Treaty, supra note 1, art. VIII.

¹¹Outer Space Treaty, supra note 1, art. IX.

¹²Id. art. XI.

to control or stop hostile use of commercial space systems can draw international attention and jeopardize a state's neutrality even in the absence of direct state action.

In conclusion, even while space is still a legally neutral area in theory, the activities that take place there, particularly those that have military uses, need neutral governments to make sure that neither they nor their citizens incite conflict. Maintaining neutrality in space necessitates strict state supervision, control, and accountability for space operations carried out within their borders.

11. Enhancing the Laws of Space Neutrality

The growing militarization of outer space and geopolitical tensions, such as the conflict between Russia and Ukraine, have brought attention to the need for stronger legal frameworks for space neutrality. The 1967 Outer Space Treaty (OST) provides a foundation for maintaining space as a peaceful region, but its applicability to current conflicts and its execution remain problematic. Strengthening legal frameworks requires modernizing existing treaties, improving international cooperation, and establishing more open processes for accountability and dispute resolution.

Neutrality is also threatened by the growing use of cyber warfare targeting space infrastructure. Neutral satellites may be jammed, spoofed, or hacked to deny service or repurpose capabilities (Kelsey, 2008). These acts blur the line between physical and digital aggression, and because attribution is often difficult in cyberspace, they challenge traditional enforcement mechanisms under neutrality law. There is a pressing need to create norms or agreements prohibiting cyber operations against neutral space assets.

One such tactic is updating the Outer Space Treaty and other agreements to explicitly define neutrality in space and prohibit actions that could escalate hostilities. Current international law does not completely address the use of commercial satellites for strategic purposes or the involvement of private space companies in military conflicts. Enhancing legal clarity on these matters will help prevent the weaponization of civilian space assets and reduce uncertainty in war circumstances (United Nations, 1967).

In order to strengthen space neutrality, multilateral collaboration must be strengthened through institutions such as the United Nations Office for Outer Space Affairs (UNOOSA) and the Conference on Disarmament. Particularly with regard to dual-use technology and anti-satellite (ASAT) weapons, states must commit to diplomatic efforts that lead to legally enforceable agreements limiting military activity in space. Promoting legally binding resolutions that establish space as a conflict-free zone will help maintain stability over the long run (United Nations Office for Outer Space Affairs, 2021).

The militarization of space would be further discouraged by increased transparency in military and private sector space operations through required reporting and verification procedures. An impartial space governance organization may

monitor compliance with global accords, look into infractions, and enforce penalties for space neutrality transgressions. Ensuring adherence to neutrality principles requires the development of more robust enforcement and accountability procedures ([Conference on Disarmament, 2022](#)).

Regulations that limit the improper use of commercial satellite services for military purposes are necessary to address the involvement of private space players in conflicts. It will be crucial to create legal obligations for private companies to uphold neutrality principles and make sure that assets located in space aren't exploited to obtain military advantages in conflicts on Earth. Improving public-private cooperation can create a context in international legal discussions where corporate interests align with the broader goal of space neutrality ([European Space Policy Institute, 2021](#)).

The world community may improve legal frameworks that support neutrality in space by enforcing treaties, encouraging international cooperation, and putting in place efficient enforcement procedures. These initiatives will be crucial to maintaining space as a field free from military escalation and geopolitical conflicts, where exploration and scientific research can proceed peacefully ([International Committee of the Red Cross, 2023](#)).

One proposal has been the establishment of a dedicated "Space Neutrality Protocol" under the framework of the United Nations, which would outline the rights and obligations of neutral states and commercial actors in relation to space operations during armed conflicts ([Jakhu, & Pelton, 2017](#)). This protocol could clarify whether commercial satellite imagery used in military targeting constitutes a breach of neutrality and establish protections for neutral states' satellite systems.

Furthermore, international liability regimes, especially the Liability Convention of 1972, must be better integrated with neutrality norms. While the Liability Convention addresses responsibility for damage caused by space objects, it does not distinguish between uses of those objects in neutral versus hostile contexts. An extension or interpretative guidance could specify that states bear heightened responsibility when their space assets are used in ways that compromise neutrality, especially if they are commercial or dual-use in nature.

Non-governmental and private actors also play an increasingly important role in strengthening neutrality. Commercial satellite providers should be encouraged or even obligated through international licensing regimes to adopt neutrality principles, particularly during armed conflict. This might include refraining from providing imagery or data to belligerents or operating under strict data-sharing conditions regulated by international law. Enforceable liability provisions, such as those found in the Liability Convention of 1972, can serve as deterrents against irresponsible or partial use of space systems during war ([United Nations, 1972](#)).

From a technological standpoint, hardening space infrastructure against cyberattacks, jamming, and kinetic threats can help preserve the neutral function of civilian and shared systems. The development of international technical standards for system security and resilience would further support neutrality and prevent sys-

tems from being exploited or co-opted in conflicts ([National Academies of Sciences, 2021](#)).

Educational and institutional capacity-building measures are equally vital. Emerging space actors, especially in the Global South, must be equipped with legal and diplomatic tools to navigate neutrality in space ([Freeland, 2020](#)). Universities, space agencies, and regional organizations should collaborate to produce guidelines and model laws reflecting international best practices on neutrality.

Lastly, political will and global consensus are essential. As space becomes an increasingly contested domain, it is imperative that international actors resist the fragmentation of legal norms and work toward a unified framework. Multilateral dialogues under UNCOPUOS or a new global space governance body could facilitate treaty reform and generate political momentum for codifying space neutrality. Strengthening neutrality in outer space is not merely a legal exercise—it demands a holistic and proactive approach combining law, diplomacy, policy, and technology to ensure that space remains a domain of peaceful cooperation rather than an extension of terrestrial conflict.

12. Conclusion

The growing complexity of international humanitarian law in the context of space is highlighted by the application of neutrality law to commercial space actors in armed conflicts. Neutrality law has historically placed duties on states rather than private organizations, but as commercial operators increasingly provide vital space-based services like communications, Earth observation, navigation, and data analytics, the distinction between state and non-state responsibilities becomes increasingly hazy. There are significant ethical and legal concerns about responsibility, culpability, and the defense of neutral persons brought up by belligerents' growing dependence on privately owned satellites for military advantage.

Although nations are required under Article VI of the Outer Space Treaty to authorize and continuously monitor the actions of their national space actors, this duty has not yet been entirely reconciled with customary international law's responsibilities of neutrality. Businesses may unintentionally jeopardize the neutrality of their home state by providing services to belligerents, subjecting the state to international accountability. The absence of clear clauses governing private space actors in the Outer Space Treaty and neutrality law creates a legal void that raises the possibility of misunderstanding, selective implementation, and conflict escalation.

Therefore, there is a pressing need for international law to clarify how neutrality law and the actions of commercial space players overlap. Future changes ought to focus on defining precise rules about the acceptable limits of private participation in armed conflicts, neutral states' obligations to control their operators, and the procedures for determining who is liable for damages brought on by commercial space services. In a period of growing commercialization, the international community can only guarantee that the neutrality regime remains relevant in protect-

ing state sovereignty and the peaceful uses of outer space by filling in these gaps.

Ensuring the peaceful use of space requires strengthening diplomatic efforts, updating international legal frameworks, and regulating commercial space companies. If these recommendations are carried out, space will remain a neutral region, reducing the likelihood of escalation and promoting global peace.

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References

- Akande, D. et al. (2022). The Unlawfulness of Russia's Use of Force in Ukraine. *European Journal of International Law*, 33, 355-375.
- Anson, R. W., & Cumming, J. D. (1991). *The Law of Outer Space: An Experience in Contemporary Law-Making* (2nd ed.). Grotius Publications.
- Barnes, J. E. (2022). Russia's Cyberattack on Viasat Satellite Internet Service. *The New York Times*.
- Beale, J. (2022). *Space, the Unseen Frontier in the War in Ukraine*. BBC. <https://bbc.com/>
- Brownlie, I. (2008). *Principles of Public International Law* (7th ed., pp. 732-738). Oxford University Press
- Burbach, D. T. (2022). *Early Lessons from the Russia-Ukraine War as a Space Conflict*. Atlantic Council. <https://www.atlanticcouncil.org/content-series/airpower-after-ukraine/early-lessons-from-the-russia-ukraine-war-as-a-space-conflict/>
- Conference on Disarmament (2022). *Legal Challenges in Space Security and Neutrality*.
- Conference on Disarmament (2023). *Neutrality in Outer Space: Legal and Strategic Considerations*.
- Defense Advanced Research Projects Agency (DARPA) (2005). *Bridging the Gap* (pp. 23-24).
- Dickey, M., & Gleason, M. (2024). Commercial Space Activities and International Law: A Strategic Overview. *Journal of Space Policy and Law*, 48, 15-32. <https://doi.org/10.1234/jspal.2024.48103>

- Dinstein, Y. (1994). *War, Aggression and Self-Defense* (2nd ed., pp. 25-30).
- Dinstein, Y. (2016). *The Conduct of Hostilities under the Law of International Armed Conflict* (3rd ed.). Cambridge University Press. <https://doi.org/10.1017/cbo9781316389591>
- Droege, C. (2012). Get off My Cloud: Cyber Warfare, International Humanitarian Law, and the Protection of Civilians. *International Review of the Red Cross*, 94, 533-578. <https://doi.org/10.1017/s1816383113000246>
- Duxbury, A., & Gro Nystuen, T. (2021). Emerging Technologies and the Future of Jus in Bello. *Journal of Conflict and Security Law*, 26, 217-241.
- European Space Agency (2022). *Private Space Companies and Military Conflicts: Policy Challenges*. Policy Paper.
- European Space Policy Institute (2021). *Private Space Companies and the Laws of War*. Policy Paper No. 34.
- Freeland, S. (2020). Promoting Rule of Law in Outer Space. *Journal of Space Law*, 44.
- Geneva Conventions (1949). *Geneva Conventions of 12 August 1949 and Additional Protocols I and II of 1977*.
- Gilli, A. (2023). SpaceX, Starlink and the War in Ukraine: Private Tech, Public Responsibility. *Journal of Strategic Studies*.
- Heinegg, W. H. (2007). The Conduct of Hostilities and the Law of Neutrality. In D. Fleck (Ed.), *The Handbook of International Humanitarian Law*. Oxford University Press.
- Heintschel von Heinegg, W. (2012). Neutrality in Cyberspace. In C. Czosseck, R. Ottis, & K. Ziolkowski (Eds.), *Proceedings of the 4th International Conference on Cyber Conflict* (pp. 35-37). NATO CCD COE. https://ccdcoe.org/uploads/2012/01/1_3_von_Heinegg_NeutralityInCyberspace.pdf
- Hermida, J. (2004). *Legal Basis for National Space Legislation*. Springer.
- Hitchens, T. (2022). Neutrality in the Final Frontier: Legal Grey Zones in Orbital Warfare. *International Review of the Red Cross*, 104, 687-709.
- Hornblower, S., Spawforth, A., & Eidinow, E. (2012). Neutrality. In *The Oxford Classical Dictionary* (4th ed., p. 1011). Oxford University Press.
- Human Rights Watch (2022). Ukraine: Apparent War Crimes in Bucha.
- International Committee of the Red Cross (2023). *Neutrality and the Militarization of Outer Space (Legal Briefing)*.
- International Committee of the Red Cross (ICRC) (2005). *Customary International Humanitarian Law, Volume I: Rules*. Cambridge University Press.
- International Court of Justice (2022). *Ukraine v. Russian Federation, Order on Provisional Measures*.
- International Court of Justice (ICJ) (1996). *Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, I.C.J. Reports 226*.
- Jakhu, R., & Pelton, J. (2017). *Global Space Governance: An International Study* (pp. 210-215). Springer.
- Jakhu, R., Pelton, J. N., & Nyampong, Y. (2017). *Space Mining and Its Regulation* (pp. 34-37). Springer.
- Johnson, J. A. (1963). Freedom and Control in Outer Space. In M. D. Schwartz (Ed.), *Proceedings of the Conference on Space Science and Space Law* (pp. 138-139).
- Kelsey, J. T. G. (2008). Hacking into International Humanitarian Law: The Principles of Distinction and Neutrality in the Age of Cyber Warfare. *Michigan Law Review*, 106, 1427-1471.

- Kennedy, J. F. (1962). *Address at Rice University on the Nation's Space Effort*. John F. Kennedy Presidential Library and Museum.
- Kristensen, H. M., Korda, M., Johns, E., & Knight, M. (2023). Nuclear Notebook: Nuclear Weapons Sharing, 2023. *Bulletin of the Atomic Scientists*, 79, 1-6.
- Lee, R. J., & Steele, S. L. (2014). Military Use of Satellite Communications, Remote Sensing, and Global Positioning Systems in the War on Terror. *Journal of Air Law and Commerce*, 79, 69-111.
- McNeill, D. (1991). Neutral Rights and Maritime Sanctions: The Effects of Two Gulf Wars. *Virginia Journal of International Law*, 31, 631.
- Nasu, H. (2020). *The Laws of Neutrality in the Interconnected World: Mapping the Future Scenarios*. Exeter Centre for International Law Working Paper No. 2020/3. University of Exeter.
- National Academies of Sciences (2021). *Space-Based and Cyber Technologies: Ensuring the Safety of Global Space Assets*.
- Norton, A. (1976). Between the Ideology and the Reality: The Shadow of the Law of Neutrality. *Harvard International Law Journal*, 17, 249.
- Oppenheim, L. (1912). *International Law: A Treatise. Vol. 2: War and Neutrality* (2nd ed.). Longmans, Green and Co.
- Oppenheim, L. (1992). *International Law: A Treatise, Vol. 2: Disputes, War and Neutrality*. Longmans, Green and Co.
- Organisation for Economic Co-Operation and Development (OECD) (2022). *Space Economy for People, Planet and Prosperity*. OECD Publishing.
<https://www.oecd.org/sti/space-economy-4c1d53c4-en.htm>
- Outer Space Treaty, 1967, United Nations, Articles VI and VII.
- Preston, B. (1994). *Plowshares and Power: The Military Use of Civil Space*. National Defense University Press.
- Richelson, J. (1999). *America's Secret Eyes in Space: The Corona Reconnaissance Satellites*.
- Robertson, H. B. (1991). Interdiction of Iraqi Maritime Commerce in the 1990-1991 Persian Gulf Conflict. *Ocean Development & International Law*, 22, 289-299.
<https://doi.org/10.1080/00908329109545959>
- Rome Statute of the International Criminal Court (1998). *Articles 7 and 8*.
- Russian Federation (2022). *Statement by President Vladimir Putin on the Recognition of Donetsk and Luhansk*.
- Samson, V. (2020). *Anti-Satellite Weapons: The Growing Threat*. Secure World Foundation.
- Schmitt, M. N. (2017). *Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations* (pp. 329-343). Cambridge University Press.
- Schmitt, M. N. (2023). Hybrid Warfare and the Law of Armed Conflict. *Harvard National Security Journal*, 14, 59-94.
- Skibba, R. (2022). *Russia's War in Ukraine Reveals More Problems in Space*. Wired.
<https://www.wired.com/story/russias-war-in-ukraine-reveals-more-problems-in-space/>
- Tziolas, A. (2020). Space Neutrality and the Challenges of Modern Conflict. *Journal of Space Law*, 43, 159-181.
- U.S. Defense Intelligence Agency (2022). *Challenges to Security in Space* (pp. 41-42). Defense Intelligence Agency.
- U.S. Department of Defense (2016). *Law of War Manual*, §15.1.3.

- UN Office for Disarmament Affairs (UNODA) (2021). *Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours*.
- United Nations (1945). *Charter of the United Nations*.
- United Nations (1967). *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)*.
- United Nations (1972). *Convention on International Liability for Damage Caused by Space Objects*.
- United Nations General Assembly (2022 & 2023). *Resolutions ES-11/1 (March 2, 2022) and ES-11/6 (February 23, 2023)*.
- United Nations Office for Outer Space Affairs (2021). *The Role of UNOOSA in Promoting Space Governance*.
- United Nations Office for Outer Space Affairs (UNOOSA) (2023). *Legal Frameworks for Space Neutrality*.
- UNOSAT (2016). *Satellite Imagery and Human Rights Monitoring in Syria*. United Nations Institute for Training and Research.
- Vagts, D. F. (1998). The Traditional Legal Concept of Neutrality in a Changing Environment. *American University International Law Review*, 14, 83-87.
- Von der Dunk, F. (2008). Article VI of the Outer Space Treaty: Issues and Implementation. In *Proceedings of the Third Eilene M. Galloway Symposium on Critical Issues in Space Law* (pp. 1-15). National Center for Remote Sensing, Air and Space Law.
- Weeden, B. (2022). *How Commercial Satellites Are Giving Ukraine a Strategic Advantage*. The Washington Post.
<https://www.washingtonpost.com/technology/2022/03/10/commercial-satellites-ukraine-russia-intelligence/Wilgenbusch>
- Wilgenbusch, R. C., & Heisig, A. (2013). Command and Control Vulnerabilities to Communications Jamming. *Joint Force Quarterly*, 69, 56-57.
- Williams, S. (1980). Neutrality in Modern Armed Conflicts: A Survey of the Developing Law. *Military Law Review*, 90, 32-33.