The Legal Aspects of NATO Space Policy

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Abstract: Outer space has become indispensable to contemporary military operations, civilian infrastructure and the functioning of modern societies. NATO's recognition of space as an operational domain reflects this strategic dependence but also raises difficult legal questions concerning the application of the North Atlantic Treaty, the United Nations Charter and international space law. This article synthesizes the principal legal issues arising from NATO's evolving space policy. It examines the legal framework governing military activities in outer space, the relationship between Article 5 of the North Atlantic Treaty and Article 51 of the United Nations Charter, the geographical limitations of Article 6, the qualification of hostile space activities as uses of force or armed attacks, and the attribution of conduct in a domain characterized by technological complexity and extensive commercial participation. The article argues that existing international law remains applicable to outer space and provides a viable basis for responding to hostile acts. Nevertheless, significant uncertainty persists regarding attacks directed exclusively against space assets. The future effectiveness of NATO's space policy will therefore depend upon clearer Allied interpretation, improved technical and legal attribution mechanisms, and closer integration of public and commercial space capabilities.

Keywords: NATO; outer space; Article 5; Article 51; collective self-defence; armed attack; attribution; international space law

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I. Introduction

The strategic importance of outer space has undergone a profound transformation during the last two decades. Once perceived primarily as a scientific and exploratory environment, outer space has gradually become an indispensable operational domain supporting virtually every aspect of modern military, political, economic and civilian activity. Satellite technologies now provide critical services including communications, intelligence gathering, navigation, missile warning, weather forecasting, precision targeting and command-and-control capabilities. Consequently, the disruption, degradation or destruction of these assets may have severe consequences extending far beyond the space environment itself, directly affecting national security, military operations and the functioning of modern societies.

The growing dependence of States on space infrastructure has been accompanied by an equally significant increase in threats directed against these capabilities. Contemporary security challenges no longer arise solely from kinetic anti-satellite weapons but increasingly include sophisticated electronic warfare techniques, cyber operations targeting satellite networks, directed-energy systems, signal jamming, spoofing and various reversible or irreversible counter-space capabilities. These developments have altered the security environment in which States operate and have generated new legal questions regarding the application of international law to activities conducted in, through and from outer space.

Against this background, the North Atlantic Treaty Organization has substantially expanded its attention to the space domain. Although NATO has relied on space capabilities since the Cold War, these assets traditionally served primarily as enabling technologies supporting operations conducted on land, at sea and in the air. The rapidly changing strategic environment demonstrated that space itself had evolved into an operational domain capable of influencing the outcome of military operations independently. NATO's perception of space therefore shifted from viewing it exclusively as a supporting environment towards recognizing it as an operational theatre requiring dedicated political, military and legal consideration.

This transformation culminated in the adoption of NATO's Overarching Space Policy in 2019, followed by the formal declaration of outer space as an operational domain. By recognising space alongside land, sea, air and cyberspace, NATO acknowledged that the protection of Allied space capabilities had become indispensable for collective defence and

operational effectiveness. The declaration reflected not only technological realities but also the increasing willingness of the Alliance to address emerging security threats within a comprehensive strategic framework.

Recognition of outer space as an operational domain nevertheless raises numerous legal questions that remain only partially answered under existing international law. Unlike cyberspace, where sustained scholarly debate and State practice have gradually clarified the application of certain legal principles, the legal framework governing military operations in outer space remains comparatively underdeveloped. International space law establishes the fundamental regime applicable beyond the Earth's atmosphere, but it was negotiated during the Cold War under assumptions that differ substantially from today's security environment. At the same time, the rules governing the use of force and collective self-defence, primarily derived from the United Nations Charter and customary international law, were drafted without specifically contemplating hostile activities involving satellites, counter-space weapons or military operations conducted in outer space.

NATO's increasing engagement in space therefore requires the interaction of two distinct yet complementary branches of international law. International space law regulates the exploration and use of outer space through principles such as freedom of exploration, non-appropriation, peaceful purposes and jurisdiction over registered space objects. The law governing the use of force determines when hostile activities may constitute an unlawful use of force or an armed attack capable of triggering the inherent right of self-defence under Article 51 of the United Nations Charter and, potentially, NATO's collective defence mechanism under Article 5 of the North Atlantic Treaty.

The coexistence of these legal regimes creates complex interpretative challenges. While the Outer Space Treaty prohibits national appropriation of outer space and limits certain categories of military activity on celestial bodies, it does not prohibit all military uses of outer space. Likewise, although Article 5 of the North Atlantic Treaty establishes the cornerstone of NATO's collective defence system, Article 6 defines its geographical scope in terms drafted long before the emergence of contemporary military space operations. Whether attacks against satellites or other space assets may fall within the scope of Article 5 therefore remains one of the most significant unresolved questions of contemporary international security law.

Legal uncertainty extends beyond the geographical applicability of collective defence. Hostile activities directed against space systems often involve cyber operations, electronic interference or other non-kinetic measures whose consequences may be difficult to assess under traditional concepts of use of force and armed attack. Attribution presents additional challenges because of the technical complexity of space operations, the increasing participation of commercial actors and the possibility that attacks may originate from non-State actors or dual-use infrastructure. These issues resemble those encountered in cyberspace and suggest that legal reasoning developed for cyber operations may provide valuable guidance for analogous questions arising in outer space.

This article examines the broader legal implications of NATO's evolving space policy. Particular attention is devoted to the interaction between international space law, the law governing the use of force and NATO's collective defence framework. The analysis focuses on the legal conditions under which hostile activities involving space assets may constitute armed attacks, whether Article 5 may apply to attacks directed against space systems, the relationship between Articles 5 and 6 of the North Atlantic Treaty and Article 51 of the United Nations Charter, and the continuing challenges associated with attributing hostile conduct in outer space.

The article proceeds from the premise that many emerging legal challenges may initially be addressed through interpretation of existing international law. Nevertheless, the accelerating militarization of outer space, the rapid evolution of counter-space capabilities and increasing strategic competition among major powers will continue to place pressure on the existing framework. The effectiveness of NATO's collective defence policy in the space domain will therefore depend not only upon technological and military developments, but equally upon continued clarification of the applicable rules of international law.

II. International Legal Framework Governing Military Activities in Outer Space

The legal regulation of military activities in outer space is characterized by the interaction of several distinct yet complementary branches of international law. Unlike traditional military domains such as land, sea and air, outer space is not governed by a single comprehensive regime specifically addressing the conduct of military operations. Questions concerning the use of force, collective self-defence and military activity in space instead require

the simultaneous application of international space law, the United Nations Charter, customary international law regulating the use of force and, where an armed conflict exists, international humanitarian law.

The absence of a dedicated body of space security law does not create a legal vacuum. Existing rules remain applicable, but their interpretation must accommodate technologies and operational practices that were not foreseen when the principal treaties were negotiated. Legal analysis of NATO's activities in outer space therefore cannot be confined to international space law alone. It must also consider the broader architecture of international law governing inter-State uses of force.

The foundation of international space law remains the 1967 Outer Space Treaty. Together with the Rescue Agreement, the Liability Convention and the Registration Convention, it constitutes the core treaty framework governing activities beyond the Earth's atmosphere. These instruments were negotiated during the Cold War with the dual objective of preventing territorial rivalry in outer space and encouraging peaceful exploration and cooperation. Their provisions establish broad constitutional principles rather than detailed operational rules concerning military conduct.

The most fundamental principle is non-appropriation. Under Article II of the Outer Space Treaty, outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claims of sovereignty, occupation or any other means. This principle distinguishes outer space from terrestrial domains. Land territory, maritime zones and national airspace are structured around sovereignty, while outer space remains beyond territorial acquisition and is open to exploration and use by all States.

The prohibition of appropriation has significant legal consequences for military activity. No State may extend sovereignty over any portion of outer space, regardless of the duration or intensity of its presence. Military operations therefore cannot rely on territorial concepts in the same manner as terrestrial conflicts. Outer space cannot be regarded as the sovereign territory of any State for the purposes of treaty interpretation, including territorial clauses contained in collective defence agreements.

The non-appropriation principle does not, however, prohibit military uses of outer space altogether. The Outer Space Treaty does not establish complete demilitarization comparable to

the legal regime of Antarctica. It imposes specific limitations on certain military activities while permitting many others.

Article IV illustrates this balance. It prohibits placing nuclear weapons or other weapons of mass destruction in orbit, installing them on celestial bodies or stationing them elsewhere in outer space. The Moon and other celestial bodies must be used exclusively for peaceful purposes, which excludes military bases, fortifications, weapons testing and military manoeuvres on their surfaces. These restrictions do not prohibit conventional weapons in outer space, military satellites, reconnaissance systems, navigation satellites or communications infrastructure supporting operations on Earth.

The distinction reflects the historical compromise underlying the Outer Space Treaty. The international community sought to prevent the deployment of the most destabilizing strategic weapons while recognizing that space technologies would inevitably acquire military applications. Contemporary armed forces rely heavily on satellites for intelligence, early warning, secure communications, positioning, navigation and targeting. Such uses are not, as such, incompatible with international space law.

Although States cannot acquire sovereignty over outer space, international law establishes legal links between States and the objects they launch. Article VIII of the Outer Space Treaty provides that the State of registry retains jurisdiction and control over a space object and its personnel while in outer space or on a celestial body. The Registration Convention further requires launching States to maintain national registries and transmit identifying information to the United Nations.

Registration facilitates identification, transparency, responsibility and liability. It also establishes continuing jurisdiction in the absence of territorial sovereignty. A registered satellite nevertheless does not become part of the territory of the registering State. This distinction has direct implications for Article 6 of the North Atlantic Treaty, whose application depends heavily on territorial and geographical concepts.

Commercialization complicates the legal picture. Satellites may be owned by private corporations, launched by one State, registered by another and operated through ground stations in multiple jurisdictions. Ownership, registration, operational control and strategic importance may therefore be divided among different legal entities. This fragmentation raises difficult

questions concerning which State may invoke self-defence when a commercially operated satellite essential to national security is attacked.

International space law regulates space activities but does not comprehensively govern the legality of force between States. Questions concerning aggression, self-defence and armed attack remain primarily governed by the United Nations Charter and customary international law. Article III of the Outer Space Treaty expressly requires activities in outer space to be conducted in accordance with international law, including the Charter.

Accordingly, the prohibition of force applies to activities in outer space as it does to operations on land, at sea or in the air. The inherent right of individual and collective self-defence also remains available when the conditions established by international law are fulfilled. International space law and the law governing the use of force therefore operate simultaneously. A military operation against a satellite might comply with the specific prohibitions of the Outer Space Treaty while still constituting an unlawful use of force. Conversely, an operation justified as self-defence must continue to respect applicable obligations of space law.

Where military activities occur in the context of an armed conflict, international humanitarian law constitutes a further component of the applicable framework. Its application depends on the existence of an armed conflict rather than the physical location of operations. The principles of distinction, proportionality, military necessity and precautions in attack therefore apply to military operations involving space systems.

The dual-use character of many satellites creates particular difficulty. A single system may support civilian telecommunications, financial transactions, navigation, emergency services and military operations. An attack on such a system may have extensive indirect effects on civilians and civilian objects. Those effects must be considered in the proportionality assessment and in the obligation to take feasible precautions.

The core legal framework remains durable, but technological developments expose important limitations. The principal treaties predate cyber operations, autonomous constellations, commercial mega-constellations, artificial intelligence-assisted systems and sophisticated counter-space capabilities. Many contemporary challenges are therefore addressed indirectly through general principles rather than explicit provisions.

The convergence of outer space and cyberspace is especially important. Satellites depend on digital networks, software and ground infrastructure, making them vulnerable to cyber operations capable of producing effects similar to kinetic attacks. Electronic warfare techniques such as jamming and spoofing may significantly degrade services without physically damaging the satellite. Hostile actions initiated in cyberspace may therefore produce strategic effects in outer space, while attacks on satellites may generate serious consequences on Earth.

For NATO, these developments underscore the need to clarify how existing international law applies to emerging technologies and operational concepts. The current framework provides a normative foundation, but questions concerning collective defence, armed attack, attribution and protection of critical space infrastructure remain unresolved. These issues are particularly significant when interpreting Articles 5 and 6 of the North Atlantic Treaty.

III. Collective Self-Defence under Article 5 of the North Atlantic Treaty and Article 51 of the United Nations Charter

The designation of outer space as a NATO operational domain has revived a complex legal question: under what circumstances may hostile activities directed against space systems trigger collective defence? Political declarations confirm the strategic importance of space for Allied security, but they do not by themselves resolve the legal uncertainty surrounding Article 5. Any assessment must therefore begin with the relationship between Article 5 of the North Atlantic Treaty and the broader right of collective self-defence recognized in Article 51 of the United Nations Charter.

The two provisions perform different functions. Article 51 preserves the inherent right of individual and collective self-defence under general international law. Article 5 creates a treaty-based commitment among NATO Allies. Their interaction is particularly significant in outer space because Article 51 contains no geographical restriction equivalent to that found in Article 6 of the North Atlantic Treaty.

Article 2(4) of the Charter prohibits the threat or use of force against the territorial integrity or political independence of any State. Article 51 preserves an exception where an armed attack occurs against a Member of the United Nations. The right is widely understood as reflecting customary international law and applies irrespective of the operational domain in

which the armed attack occurs. Nothing in the Charter limits self-defence to terrestrial operations.

Hostile activities involving satellites, space-based systems or ground infrastructure supporting space operations are therefore not excluded from Article 51 merely because part or all of the operation occurs in outer space. Unlike the Washington Treaty, Article 51 refers simply to an armed attack against a Member State. Its legal basis is consequently broader.

This distinction means that, even where Article 5 is not formally engaged because of the territorial limitations of Article 6, NATO Allies may still rely on Article 51, provided that all legal conditions for self-defence are satisfied. These include the existence of an armed attack, attribution of the attack to a responsible actor, necessity and proportionality. In collective self-defence, the victim State must also identify itself as the object of an armed attack and request assistance. Other States cannot lawfully intervene solely on the basis of their own unilateral assessment.

If a NATO Ally became the victim of an attack on a space system, collective action under Article 51 would therefore depend on cumulative conditions. The conduct would have to reach the threshold of armed attack. It would have to be attributable in law. The victim State would need to invoke self-defence and request assistance. Any response would then have to remain necessary and proportionate.

Article 5 of the North Atlantic Treaty creates a more specific institutional mechanism. It provides that an armed attack against one or more Allies shall be considered an attack against them all and permits each Ally to assist by taking such action as it deems necessary, including armed force. Article 5 is the legal and political foundation of NATO's collective defence system, but it was drafted in 1949, before the first artificial satellite and before the emergence of space-based military infrastructure.

The Alliance has nevertheless interpreted Article 5 dynamically in response to new threats. Its application has been considered in relation to terrorism and serious cyber operations, even though neither appears expressly in the Treaty. This practice demonstrates that the provision is not frozen in the technological context of 1949. Outer space, however, presents a particular difficulty because Article 6 expressly defines the geographical scope of Article 5.

Article 6 primarily refers to attacks on the territory of the Parties in Europe or North America and to attacks on their forces, vessels or aircraft in specified areas. This creates a major obstacle to applying Article 5 automatically to attacks against satellites operating beyond the Earth's atmosphere.

Outer space cannot form part of Allied territory because Article II of the Outer Space Treaty excludes national appropriation. A satellite in orbit is subject to the jurisdiction and control of a State of registry, but it is not located on that State's territory. Celestial bodies likewise cannot be treated as Allied territory or islands under the North Atlantic Treaty. Consequently, the first limb of Article 6 does not readily encompass attacks directed exclusively against space objects.

This does not mean that attacks involving outer space are wholly excluded. An attack launched from space against the territory of a NATO Ally would fall within the territorial logic of Article 5 because the attack is directed against Allied territory. The more difficult issue concerns attacks against space assets themselves.

Modern armed forces depend on satellites for communications, intelligence, missile warning, navigation and targeting. Disabling such a satellite may substantially weaken a State's military capacity even without causing immediate physical destruction on Earth. Strategically, the consequences may be comparable to attacks on terrestrial military infrastructure. Article 6, however, does not turn only on strategic significance; it also reflects geographical categories.

A further possibility is to examine whether satellites might qualify as forces, vessels or aircraft. The term vessel traditionally refers to maritime platforms and cannot reasonably encompass satellites. Aircraft are machines deriving support from reactions of the air and therefore operate within the atmosphere. Space objects beyond atmospheric flight do not fit that category.

The concept of forces is more complex. Several States now maintain dedicated military space organizations. From a functional perspective, their personnel and units are unquestionably armed forces. Yet even if space forces fall within the concept of forces, Article 6 still links the protection of forces to specified geographical areas. Space forces or their assets operating exclusively in orbit remain difficult to place within the existing text.

These difficulties have prompted discussion of dynamic interpretation. NATO Allies could adopt a common interpretative declaration clarifying how Articles 5 and 6 apply to hostile acts against critical space systems. Under the law of treaties, subsequent agreements and subsequent practice may contribute to interpretation. NATO's approach to cyber operations demonstrates that a common understanding can evolve without immediate formal treaty amendment.

A functional interpretation would focus on the consequences of an attack and the strategic relationship between the targeted system and the victim State. It could recognize that an attack against an essential space capability may constitute an attack against the Ally even where the object is physically beyond the Treaty area. Such an interpretation would preserve continuity while adapting the Treaty to modern defence realities.

There are limits, however, to what interpretation can achieve. A reading that effectively removes the geographical structure of Article 6 may be criticized as treaty amendment by interpretation. Formal amendment would provide greater legal certainty but would be politically and procedurally difficult. It would require consensus and national ratification while reopening the constitutional foundation of the Alliance.

The most realistic approach is therefore to view Articles 5 and 51 as complementary. Article 5 offers the institutional framework through which NATO coordinates collective defence. Article 51 supplies the broader legal authority for using force in individual or collective self-defence. Where Article 6 creates uncertainty, Article 51 remains available if an armed attack has occurred and the relevant conditions are fulfilled.

This relationship is particularly important in outer space. The Washington Treaty may not presently accommodate every hostile act involving satellites, but general international law is not similarly confined. The decisive questions become whether the conduct qualifies as an armed attack, whether it can be attributed and whether the response satisfies necessity and proportionality.

IV. Hostile Space Activities, Use of Force and the Armed-Attack Threshold

The applicability of Article 5 of the North Atlantic Treaty and Article 51 of the United Nations Charter ultimately depends on the legal characterization of the hostile conduct. Not every interference with a space system constitutes a use of force, and not every use of force reaches the higher threshold of an armed attack. This distinction is central because the available legal responses differ substantially according to the gravity of the act.

A State confronted with an internationally wrongful act below the level of force may resort to diplomatic measures, retorsion or, where the legal conditions are met, countermeasures. A prohibited use of force that does not amount to an armed attack does not automatically permit forcible self-defence. The right of self-defence arises only when the gravity of the conduct crosses the armed-attack threshold.

In conventional settings, kinetic attacks causing death, injury or significant physical destruction provide the clearest examples of force and armed attack. Outer space complicates this analysis because hostile operations may be kinetic, cyber, electronic or otherwise non-kinetic. Their immediate physical manifestations may be limited, while the secondary effects on military operations and civilian infrastructure may be severe.

A direct kinetic anti-satellite strike that destroys a military satellite and creates dangerous debris would ordinarily present a strong case for classification as a use of force. Whether it also constitutes an armed attack would depend on its scale and effects. Destruction of a single satellite of limited strategic importance may not necessarily cross the threshold. Destruction of several critical satellites, a missile-warning constellation or systems indispensable to national defence would be far more likely to qualify.

The assessment becomes more difficult where no physical destruction occurs. Jamming may temporarily deny access to satellite communications or navigation. Spoofing may generate false signals and cause aircraft, vessels or military units to rely on inaccurate information. Cyber operations may take control of a satellite, corrupt its data, disable its functions or redirect it. Directed-energy systems may damage sensors without destroying the platform. Such operations can have effects equivalent to conventional attacks even though the satellite remains physically intact.

The appropriate approach is therefore effects-based rather than technology-based. The legal characterization should not depend solely on the instrument used. A non-kinetic operation capable of causing consequences comparable to those produced by conventional force may itself constitute a use of force. Likewise, where the consequences are sufficiently grave, it may amount to an armed attack.

The scale-and-effects analysis developed in the jurisprudence of the International Court of Justice provides the central framework. Only the gravest forms of the use of force constitute armed attacks. The distinction requires consideration of the intensity, duration, scope and consequences of the operation. In the space context, relevant effects may occur in orbit, on Earth or across both environments.

Physical destruction is an important indicator but is not indispensable. The disabling of navigation satellites could endanger aircraft and ships, disrupt emergency services and impair military command. Interference with missile-warning satellites could create a risk of miscalculation or prevent detection of an incoming attack. Disabling communications satellites could isolate military units or undermine a State's capacity to defend itself. A cyber operation that renders a constellation permanently inoperable may produce effects equivalent to physical destruction.

Human consequences are particularly significant. Operations that cause death or injury by disrupting satellite-dependent services are strong candidates for classification as armed attacks. For example, manipulation of positioning data that leads to an aircraft crash or interference with emergency communications during a disaster may produce direct consequences comparable to conventional violence.

Damage to property and critical infrastructure also matters. The destruction or permanent disablement of expensive space assets may represent substantial material damage. Yet financial value alone is unlikely to be decisive. The strategic function of the asset, the extent of service disruption and the consequences for national security must also be considered.

A further issue concerns attacks whose effects are primarily economic. Modern societies depend on satellite timing signals for financial transactions, telecommunications and energy networks. Disruption may cause severe economic losses without physical destruction. International law has not definitively established whether purely economic harm can cross the

armed-attack threshold. The stronger argument arises where the economic disruption is so extensive that it seriously undermines essential State functions or produces consequences comparable to conventional attacks.

The dual-use nature of satellite systems complicates the analysis. A commercial constellation may serve civilian users while also supporting military communications or intelligence. An attack against such a system may affect several States and millions of users. Determining whether a particular State has suffered an armed attack requires examination of the relationship between the system and that State, the importance of the services provided and the effects on its territory, population or armed forces.

Registration and ownership are relevant but not conclusive. A satellite may be registered by one State, owned by a corporation incorporated in another and used predominantly by a third State's military. The phrase armed attack against a Member State should therefore be interpreted through a factual assessment of control, function, reliance and consequences rather than formal registration alone.

Cumulative hostile conduct creates another difficult issue. A series of individually minor interferences may, over time, produce consequences equivalent to a major attack. Repeated jamming, cyber intrusions and degradation of several satellites may collectively undermine national defence. International law increasingly recognizes that closely connected operations by the same actor may be assessed in aggregate where they form part of a coherent campaign.

Aggregation should nevertheless be applied cautiously. The incidents must be sufficiently connected in authorship, purpose, time and effects. Otherwise, unrelated acts could be combined artificially to justify self-defence. NATO would need shared criteria for determining when a pattern of hostile space activity crosses the threshold.

Intent is relevant but not necessarily decisive. In conventional operations, hostile intent may help distinguish force from accident. Space operations, however, involve complex systems and consequences that may be difficult to predict. An operation deliberately designed to interfere with a satellite may produce greater damage than intended. The legal assessment should focus primarily on objective consequences, while intent remains an evidentiary factor.

Accidents, technical failures and negligent conduct must be distinguished from armed attacks. A collision caused by poor space-traffic management or debris generated without hostile

purpose may engage responsibility or liability under space law but would not ordinarily constitute an armed attack. The requirement of hostile conduct therefore remains important even within an effects-based analysis.

The threshold assessment also has institutional implications. NATO's political bodies may determine that a hostile act threatens Allied security, but political concern does not automatically resolve the legal classification. Any invocation of collective self-defence must be supported by a reasoned assessment capable of being explained to the international community. Article 51 of the United Nations Charter requires measures taken in self-defence to be reported to the Security Council, reinforcing the need for a coherent legal justification.

Necessity and proportionality remain separate from the armed-attack threshold. Even where an attack qualifies, the response must be necessary to halt or repel it and proportionate to that defensive aim. A response need not occur in the same domain. A State attacked in outer space may respond through cyber, terrestrial, maritime, air or space means, provided that the chosen measures comply with international law.

The possibility of cross-domain response is strategically important. The victim State may not possess the technical capacity to respond directly against the attacking space asset. It may instead target ground infrastructure or other military capabilities connected to the attack. The legality of such action depends on attribution, necessity, proportionality and the law of armed conflict where applicable.

NATO should therefore develop a common methodology for assessing scale and effects in the space domain. Relevant factors should include physical damage, permanence of disruption, loss of functionality, human consequences, effects on critical services, strategic military impact, geographical spread, duration and cumulative character. A shared methodology would improve predictability while preserving the case-by-case nature of the legal assessment.

No single indicator should be treated as conclusive. The armed-attack threshold must remain sensitive to the totality of circumstances. Outer space demonstrates particularly clearly that legal gravity cannot be measured solely by visible destruction. A technically reversible act may produce immediate and severe consequences, while the physical destruction of a less important satellite may have only limited strategic effect.

The central legal principle is therefore functional equivalence. Hostile space activities should be assessed by comparing their consequences with those of conventional operations already recognized as uses of force or armed attacks. This approach preserves the established structure of international law while allowing it to respond to technological change.

V. Attribution of Hostile Acts in Outer Space

One of the greatest legal and operational challenges associated with NATO's evolving space policy concerns attribution. Even where a hostile act clearly satisfies the threshold of armed attack, collective response depends on identifying the responsible actor with sufficient certainty. Attribution is not merely political or technical. It is a legal prerequisite for engaging State responsibility and for directing measures of self-defence against the correct actor.

The complexity of attribution has increased because modern space infrastructure frequently combines governmental, military and commercial systems operating across several jurisdictions. Satellites may be owned by private corporations, launched by another State, registered by a third State and operated through ground stations located in multiple countries. This fragmented environment complicates legal responsibility for hostile acts involving space assets.

Many counter-space operations are also designed to conceal their origin. Electronic interference, cyber operations, signal spoofing, jamming and other reversible capabilities may produce significant effects while leaving little immediately observable evidence. The attribution problem therefore resembles that encountered in cyberspace.

For NATO, collective defence cannot rest solely on strategic suspicion. Before the Alliance or individual Allies may lawfully act in self-defence, there must be a persuasive legal basis connecting the hostile conduct to a responsible State or other actor.

Attribution has several dimensions. Technical attribution seeks to determine how the operation was conducted and where it originated. It may involve telemetry, orbital tracking, cyber forensics, electronic intelligence and radar observations. Technical attribution identifies the physical or digital source but does not necessarily establish legal responsibility.

Political attribution consists of public or diplomatic identification of the alleged responsible actor. States may rely on classified intelligence or coordinated assessments. Political attribution can support deterrence and coalition-building, but it does not by itself satisfy the legal rules of responsibility.

Legal attribution asks whether conduct may be regarded as the act of a particular State. This determination governs State responsibility, countermeasures and self-defence. Technical certainty does not automatically produce legal certainty. A satellite may be identified as the source of interference while the responsibility of the registering or operating State remains contested.

The general rules of State responsibility provide the principal framework. Conduct is attributable when carried out by State organs, entities exercising governmental authority or persons acting under the instructions, direction or control of the State. The fact that an operation originated from infrastructure associated with a State is evidence, but it is not necessarily conclusive.

Ground stations, communication networks and satellite control systems may be operated by commercial contractors or public-private partnerships. Malicious interference may originate from infrastructure located within a State without authorization by that State. Geography and technical origin therefore cannot substitute for a legally significant connection between the conduct and governmental authority.

The cyber domain offers useful analogies. The mere fact that an operation originates from governmental infrastructure does not establish that the State directed or controlled it. Government systems may be compromised or misused. The same reasoning applies to satellites and terrestrial space infrastructure. Additional evidence is required to connect the operation to the State apparatus.

A cautious approach is essential because erroneous attribution may produce escalation and undermine the legality of any defensive response. At the same time, the standard should not become so demanding that States can avoid responsibility by using proxies, contractors or opaque institutional arrangements.

International space law offers a mechanism largely absent from cyberspace: the registration regime. Under Article VIII of the Outer Space Treaty, the State of registry retains

jurisdiction and control over a space object. The Registration Convention requires identifying information to be provided to the United Nations. Registration may therefore facilitate identification of objects involved in hostile incidents.

Registration creates a legal connection relevant to jurisdiction, responsibility and liability. It can be highly persuasive evidence where a registered satellite is used in a hostile operation. Nevertheless, registration alone does not prove that the registering State authorized or directed the specific conduct, especially where the object is privately owned or operated.

Commercialization further complicates attribution. Commercial satellites may support government communications, military logistics, intelligence and navigation while serving civilian users. A privately owned platform may be operated under government contract, and a government-owned system may depend on commercial contractors. Neither ownership nor registration is therefore sufficient in isolation.

The assessment should consider operational control, contractual relationships, government instructions, integration into military structures, financing, data access and the function performed by the asset. The greater the governmental involvement in directing the operation, the stronger the case for legal attribution.

Non-State actors present an additional challenge. Private organizations, criminal groups and technologically capable individuals may interfere with space systems. International law generally requires a sufficient connection to a State before their conduct becomes attributable to that State.

The effective-control standard developed in international jurisprudence remains relevant. Conduct by private actors is attributable where a State exercises effective control over the specific operation. This standard promotes consistency, but its application to technologically complex operations may be difficult. Governments may provide financing, intelligence, technical support or access to infrastructure without directing every operational detail.

The relationship between effective control and broader forms of support will therefore remain contested. Space operations may encourage the same debates already familiar from cyber operations and proxy warfare. NATO legal assessments will need to distinguish between responsibility for the specific act, responsibility for assistance or support, and a State’s separate obligation not to allow its territory or infrastructure to be used for harmful conduct.

Attribution is also temporal. States may need to act quickly to prevent continuing harm, yet robust legal attribution may require prolonged investigation. NATO should therefore develop procedures capable of combining rapid preliminary assessment with later verification. Different response measures may require different degrees of confidence. Diplomatic protest or defensive technical measures may be possible at a lower confidence level than forcible self-defence.

Institutional cooperation is crucial. Shared space situational awareness, intelligence exchange, cyber forensics and technical monitoring can improve Allied capacity to identify hostile conduct. Common standards for evidentiary assessment would also reduce the risk that Allies reach inconsistent conclusions.

Attribution ultimately remains a legal judgment based on a body of evidence rather than a single technical indicator. Registration, ownership, control, infrastructure, operational behaviour, intelligence and motive may all contribute. The totality of circumstances must demonstrate a sufficiently strong connection between the hostile act and the responsible actor.

Without credible attribution, collective self-defence in outer space remains constrained. The future effectiveness of NATO's space policy will therefore depend as much on the development of attribution mechanisms as on technological capability or doctrinal declarations.

VI. Future Development of NATO Space Policy and International Law

The legal questions surrounding NATO's activities in outer space are unlikely to remain static. Technological innovation, militarization, dedicated military space commands and growing dependence on space-based capabilities will continue to test the existing framework. The fundamental principles of international law remain applicable, but their implementation requires clarification in light of operational realities not envisaged by the drafters of the United Nations Charter or the North Atlantic Treaty.

Current international law does not leave military activity in outer space unregulated. International space law, the law governing the use of force and international humanitarian law provide a broad framework. Important uncertainty nevertheless persists regarding collective defence, the qualification of hostile activity, attribution and the interpretation of Article 6.

The future development of NATO space policy should therefore focus primarily on interpretation and institutional practice rather than replacement of the existing legal order. There is no immediate legal necessity for an entirely new treaty governing military activity in outer space. The Outer Space Treaty continues to provide the constitutional framework, the United Nations Charter regulates force and self-defence, and international humanitarian law governs operations conducted during armed conflict.

The principal challenge lies in applying these rules to new technologies. As occurred in cyberspace, greater clarity will emerge through State practice, national legal positions, Alliance doctrine, judicial reasoning and scholarly analysis. This evolutionary approach preserves continuity and avoids fragmentation.

The interpretation of Articles 5 and 6 remains the most important issue for NATO. The wording of Article 6 reflects the strategic geography of 1949. Its territorial assumptions do not correspond easily with the role of satellites in twenty-first-century defence. A common Allied interpretative understanding could clarify how attacks against essential space systems relate to collective defence.

The law of treaties recognizes subsequent agreements and subsequent practice as relevant to interpretation. NATO members could therefore articulate a common position without immediately amending the Treaty. Such a position might emphasize that hostile acts against critical space capabilities can, depending on their scale and effects, constitute armed attacks against the Ally that relies upon them.

This approach would be consistent with NATO's adaptation to cyber threats. It would focus on function and consequences rather than the physical location of the target. Nevertheless, the interpretation should remain connected to the text and object of the Treaty. It should not simply erase the geographical structure of Article 6.

Formal amendment remains an alternative. An amended Treaty could refer expressly to outer space and define attacks against space assets. This would provide legal certainty but would be politically demanding. It would require consensus, national ratification and potentially broader negotiation of the Alliance's core obligations. For that reason, interpretative development is more realistic in the near term.

Institutional development is equally important. Space considerations should be integrated into NATO planning, exercises, intelligence, resilience and crisis decision-making. Dedicated legal and technical expertise will be necessary because the characterization of hostile space activity depends on complex facts.

Improved information sharing and space situational awareness are essential, particularly for attribution. NATO should strengthen mechanisms for sharing orbital data, cyber indicators, electronic intelligence and assessments of hostile behaviour. Cooperation among legal advisers, military planners, engineers and intelligence specialists should become routine.

Commercial space actors will occupy an increasingly important place in Allied security. Private constellations already provide communications, imagery, navigation and other services relevant to military operations. NATO policy should therefore address protection, resilience, contractual continuity and information sharing with commercial operators.

The legal status of commercially owned dual-use systems requires particular attention. Allies should clarify how reliance on a commercial system affects the characterization of an attack against it, which State may invoke self-defence and how the private operator's conduct may be attributed. National legislation and procurement contracts may influence these questions, but common Allied principles would improve predictability.

Resilience should form part of the legal and strategic response. Collective defence does not begin only after an armed attack. Redundancy, distributed constellations, cyber security, rapid replacement capacity and continuity planning can reduce vulnerability and make hostile activity less effective. Strong resilience may also create more time for accurate attribution and legal assessment.

NATO's role must remain connected to wider international cooperation. Outer space is governed by universal treaties and remains an environment used by all States. Long-term stability cannot be secured exclusively through a regional alliance. The United Nations, the Committee on the Peaceful Uses of Outer Space, the Conference on Disarmament and other forums remain important for transparency, responsible behaviour and risk reduction.

Confidence-building measures may reduce misunderstanding and accidental escalation. Notification of certain activities, improved registration, communication channels and shared

standards of responsible behaviour could contribute to stability even where comprehensive arms-control agreements remain politically difficult.

The development of customary international law will also be important. Clear national positions on how States interpret use of force, armed attack, self-defence and attribution in outer space can gradually shape expectations. Silence and strategic ambiguity may preserve short-term flexibility, but excessive ambiguity can undermine deterrence and increase the risk of miscalculation.

NATO should therefore seek a balance between preserving operational discretion and articulating enough legal clarity to signal consequences. Public confirmation that serious hostile acts against Allied space systems may trigger collective defence can strengthen deterrence, while case-by-case assessment preserves necessary flexibility.

The future legal framework will likely remain plural. International space law, the United Nations Charter, international humanitarian law, State responsibility and NATO treaty law will continue to operate together. The objective should not be to create a separate and isolated law of space conflict, but to ensure coherent application of established principles to the space domain.

VII. Conclusion

Outer space has become indispensable to military operations, economic activity and civilian life. NATO's recognition of space as an operational domain reflects a profound change in the strategic environment and the dependence of Allied defence on satellite services.

Existing international law remains applicable. International space law establishes the legal status of outer space and space objects. The United Nations Charter governs the prohibition of force and the right of self-defence. International humanitarian law applies where operations occur in the context of armed conflict. These regimes are complementary rather than mutually exclusive.

The principal uncertainty concerns the relationship between Articles 5 and 6 of the North Atlantic Treaty. Article 51 of the United Nations Charter applies without an equivalent geographical limitation, while Article 6 reflects territorial categories drafted before the space

age. Attacks launched from outer space against Allied territory can fall within Article 5, but attacks directed solely against satellites are more difficult to reconcile with the existing text.

A functional interpretation focusing on strategic connection, scale and effects may help address this gap. NATO practice concerning cyber operations demonstrates that the Alliance can adapt collective defence to new domains. Yet interpretation has limits, and a common Allied understanding is needed to reduce uncertainty.

The classification of hostile space activity must remain effects-based. Kinetic destruction, cyber operations, jamming, spoofing and directed-energy interference may all constitute force where their consequences are comparable to conventional military operations. Only the gravest forms reach the armed-attack threshold. The assessment should consider physical damage, loss of functionality, human consequences, disruption of critical services, strategic military impact, duration and cumulative effects.

Attribution is equally decisive. Technical identification, political assessment and legal attribution must be distinguished. Registration of space objects provides valuable evidence, but it does not automatically prove governmental direction of a specific operation. Commercial ownership, multinational infrastructure and non-State actors require a fact-sensitive application of the rules of State responsibility.

The current legal order does not require fundamental reconstruction. Its effectiveness depends on clearer interpretation, stronger institutional cooperation, better attribution mechanisms and improved resilience. NATO should continue integrating legal, military, technical and commercial perspectives into its space policy.

As outer space becomes increasingly contested, legal clarity will itself become a component of deterrence and security. The success of NATO's future space policy will depend not only on technological capability, but also on the Alliance's capacity to apply established international law coherently to one of the most dynamic operational environments of the twenty-first century.

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