

Legal and Policy Aspects of the Use of Satellites in Armed Conflicts

Edited by
*Balázs Bartóki-Gönczy, Philippe Achilleas
& Barbara Horváth*



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TREATIES AND INTERNATIONAL CONVENTIONS

Budapest Convention	Convention on Cybercrime and Its Protocols, opened for signature 23 November 2001, entered into force 1 July 2004
Chicago Convention	Convention on International Civil Aviation, signed 7 December 1944, 15 UNTS 295, entered into force 4 April 1947
CTBT	Comprehensive Nuclear-Test-Ban Treaty, adopted 10 September 1996 by the United Nations General Assembly, UN Doc. A/50/1027, opened for signature 24 September 1996, New York (not in force)
ENMOD Convention	Convention on the Prohibition of Military or Any Hostile Use of Environmental Modification Techniques (ENMOD), adopted 18 May 1977, opened for signature 18 May 1977, entered into force 5 October 1978
Executive Order 14186 of 27 January 2025	The Iron Dome for America. Federal Register, 90(21), 3 February 2025, 8767–8769
Hague Convention (V)	Respecting the Rights and Duties of Neutral Powers and Persons in Case of War on Land, concluded 18 October 1907, entered into force 26 January 1910
Hague Convention (XIII)	Concerning the Rights and Duties of Neutral Powers in Naval War, concluded 18 October 1907, entered into force 26 January 1910
ILC Draft Articles on Armed Conflicts	Draft Articles on the Effects of Armed Conflicts on Treaties, with Commentaries, International Law Commission, 2011
ITU Convention	Constitution and Convention of the International Telecommunication Union, Geneva, concluded 22 December 1992, entered into force 1 July 1994
Liability Convention	Convention on the International Liability for Damage Caused by Space Objects, London, Moscow, Washington, concluded 29 March 1972, entered into force 1 September 1972

Moon Agreement	Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, New York, concluded 5 December 1979, entered into force 11 July 1984
North Atlantic Treaty	North Atlantic Treaty, Washington, 4 April 1949, 34, UNTS 243
Outer Space Treaty	Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, concluded 27 January 1967, entered into force 10 October 1967
Partial Nuclear Test Ban Treaty (PTBT)	Treaty Banning Nuclear Tests in the Atmosphere, in Outer Space and Under Water, 10 October 1963
Protocol I (Additional Protocol I)	Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the Protection of Victims of International Armed Conflicts (Protocol I) (1977), 1125 UNTS 3, entered into force 7 December 1978 (Additional Protocol I)
Registration Convention	Convention on Registration of Objects Launched into Outer Space, New York, concluded 14 January 1975, entered into force 15 September 1976
Rescue Agreement	Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Washington, Moscow, London, concluded 22 April 1968, entered into force 3 December 1968
Treaty on European Union (TEU)	Treaty on European Union, consolidated version, OJ C 202, 07.06.2016
Treaty on the Functioning of the European Union (TFEU)	Treaty on the Functioning of the European Union, consolidated version, OJ C 202/47, 07.06.2016
UN Charter	Charter of the United Nations, San Francisco, concluded 26 June 1945, entered into force 24 October 1945
United Nations Convention on the Law of the Sea (UNCLOS)	United Nations Convention on the Law of the Sea (UNCLOS), opened for signature 10 December 1982, 1833 UNTS 3, entered into force 16 November 1994
Vienna Convention (VCLT)	Vienna Convention on the Law of Treaties, Vienna, 23 May 1969, UNTS vol. 1155, 331, entered into force 27 January 1980

EDITORS' PREFACE

Outer space is not only congested but increasingly contested. A substantial proportion of the approximately 16,000 satellites orbiting the Earth are utilised for military purposes. Primarily, they are engineered to safeguard systems deployed in outer space that provide critical capabilities, and secondly, they facilitate ground-based defensive and offensive capabilities. In accordance with the principle of international law that has become customary law, the utilisation of outer space is permitted exclusively for peaceful purposes, without excluding non-aggressive military use in Earth orbits.

The war in Ukraine has brought to the fore the pivotal function of satellites in contemporary warfare, encompassing communication capabilities, Earth observation, navigation, and even the control of weapon systems. This series of events gives rise to a number of legal issues that must be addressed. This objective guided the joint research initiative undertaken by the Budapest-based Institute of Aerospace and Telecommunications Law (Ludovika University of Public Service) and the Paris-based Institute of Space and Telecommunications Law (Université Paris-Saclay) on the legal and political issues arising from the utilisation of satellites during armed conflicts. This collaborative endeavour was facilitated by the Hubert Curien – Balaton grant, which was awarded to the two institutes. Our profound gratitude is extended to both the Hungarian and French funding bodies for their invaluable support.

The research commenced in early 2025 with the delineation of research topics, which, it must be acknowledged, could not be exhaustive. Nevertheless, it is asserted that the most salient topics are addressed in the book. In December 2025, the researchers convened in Budapest, where the completed manuscripts were discussed with numerous internationally recognised

experts. Therefore, the finalised studies were subjected to two cycles of peer review, in addition to a public manuscript discussion.

The project was conducted by a team of twelve researchers, half of whom were doctoral students specialising in space law and policy. This aspect of the project is particularly noteworthy. The volume's eleven studies have been divided into three major thematic areas. The initial five studies concentrate on the legal foundations and governance of the military utilisation of outer space. The second section of the publication contains two articles that analyse the legal implications of the involvement of private sector space companies. The third section of the publication presents a series of articles that analyse the strategic considerations facing the federal system, NATO and the EU.

The present volume has not sought to address every relevant aspect of this extensive topic, nor could it have done so comprehensively. Nevertheless, it is believed that the reader holds in their hands a work that is both comprehensive and valuable, and which may contribute to the academic debate.

In conclusion, gratitude is extended to Ludovika University of Public Service, Université Paris-Saclay, and the French Institute in Budapest for their substantial financial contributions, which have been instrumental in bringing this volume to fruition.

PART ONE:
LEGAL FOUNDATIONS AND GOVERNANCE
OF THE MILITARY USE OF OUTER SPACE

MILITARY ACTIVITIES IN OUTER SPACE IN LIGHT OF THE OUTER SPACE TREATY

INTRODUCTION

The legal regime governing the military use of outer space is marked by a fundamental ambiguity. The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies (hereinafter: Outer Space Treaty), signed on 27 January 1967, is often associated with the idea that outer space constitutes a non-militarised domain. This perception is not without foundation. The Treaty was negotiated within the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS). The very name of this body suggests that outer space activities should be limited to peaceful purposes and may give the impression that military uses are excluded. In addition, the preamble of the Outer Space Treaty emphasises the common interest of mankind and the need to preserve outer space for peaceful purposes.

This perception was reinforced by the background in which the Treaty was adopted. In the context of the Cold War and the fear of a nuclear conflict, the United Nations¹ and the media² placed its adoption under the banner of peace and disarmament. At the same time, during the first years of space exploration, the military dimension of space activities was largely kept confidential. Public discourse focused on scientific and technological progress and on the idea that space exploration would serve humanity. Even today, the military origins of space activities, such as the work of

¹ See UNGA Res. 2222 XXI, which adopts the Outer Space Treaty and strongly emphasises the peaceful use of outer space.

² FRANKEL 1967; SCHWÖBEL 1967.

Wernher von Braun on V2 missiles for Nazi Germany, remain a sensitive or marginal topic.³

It was only at the turn of the 1980s that the military use of outer space began to emerge as a subject of public debate. A decisive point was the Strategic Defense Initiative (SDI) presented by Ronald Reagan in a televised address on 23 March 1983. This project, also known as ‘Star Wars’, brought back to the forefront the question of deploying weapons in space and highlighted the strategic role of space technologies.

Today, the link between space and defence is evident. Recent conflicts, including the war in Ukraine and in the Middle East, show that outer space has become an essential component of military operations. Space systems ensure surveillance, communications and navigation. Without satellites, armed forces are blind, mute and immobile. At the same time, the current international context is marked by renewed rearmament, which is impacting the space sector. Outer space is not only highly militarised. It is also increasingly contested, with acts such as jamming, cyber operations and close-proximity manoeuvres in orbit. Several States, including the United States with the creation of the United States Space Force and France with the establishment of the Space Command (*Commandement de l'espace*) have developed dedicated military space structures. Similar developments can be observed in China, with the People's Liberation Army Aerospace Force, and in Russia, through the Russian Space Forces. While only a few States have created fully-fledged space forces, these initiatives reflect the growing integration of space into military strategies. Outer space is becoming a theatre of operations in its own right. The “Star Wars” scenario is no longer science fiction.

Against this background, the question arises: What does the Outer Space Treaty say about military activities in outer space? A first reading could suggest that the principle of peaceful use excludes any military action. This

³ The recent publication of Irénée Régnauld and Arnaud Saint-Martin, *Une histoire de la conquête spatiale. Des fusées nazies aux astrocapitalistes du New Space* (Paris: La Fabrique, 2024), has drawn attention to the military origins of space activities. Its first chapter, on the “Nazi roots of astronautics”, revisits a largely overlooked dimension and has created a certain unease within parts of the French space community.

is not the case. The Treaty is largely permissive about the militarisation and even the weaponisation of outer space. Only the Moon and other celestial bodies are subject to a strict regime of non-militarisation.

This situation can be explained by several factors. First, space technologies are inherently dual use. There is no fundamental difference between a launch vehicle and a ballistic missile, or between a civilian Earth observation satellite and a military surveillance satellite. Second, no State can play a major military role without access to space capabilities. Satellites are essential to ensure connectivity and data for armed forces. Third, military public procurement plays a key role in financing space programmes, through captive markets linked to national defence.

A careful reading of the Treaty shows that its drafters opted for a regime of partial demilitarisation, reflected in Article IV, which is the central provision on the militarisation and weaponisation of outer space. At the same time, even if the Treaty remains permissive, military space operations must comply with the other principles of the Treaty, which constrain the action of States.

THE LIMITED DEMILITARISATION REGIME UNDER ARTICLE IV OF THE OUTER SPACE TREATY

The principle of the peaceful use of outer space, as affirmed in the Preamble of the Outer Space Treaty, is given concrete expression in Article IV, which translates it into binding obligations. It thus formalises this fundamental principle, recognised by the United Nations from the very beginning of the space age. Indeed, the legal understanding of “peaceful purposes” in outer space did not emerge fully formed in the 1967 Outer Space Treaty but was progressively shaped through early resolutions of the United Nations General Assembly. In this respect, Resolution 1348 (XIII) of 13 December 1958, entitled “Question of the Peaceful Use of Outer Space”, constitutes the very first United Nations resolution devoted to outer space. It refers to the use of outer space for “peaceful purposes only”, suggesting, at least *prima facie*, an ambition to exclude any military activity. However, this formulation was significantly nuanced one year later in Resolution 1472

(XIV) of 12 December 1959, entitled “International Co-operation in the Peaceful Uses of Outer Space”, which referred more broadly to the “peaceful use of outer space”, thereby omitting the term “only”. This subtle but decisive linguistic shift reflects an early accommodation of strategic realities.

By the late 1950s, outer space had already become an area of geopolitical significance. Both the United States and the Soviet Union had begun developing space-based capabilities with clear military implications, notably reconnaissance satellites. The American CORONA programme, initiated in 1959 with its first successful mission in 1960 (KeyHole series), and the Soviet Kosmos satellites, deployed from the early 1960s, illustrate the rapid integration of space technologies into national security strategies. In this context, a strict prohibition of military uses of outer space would have been politically untenable for the two superpowers.

The transition from “peaceful purposes only” to “peaceful purposes” thus marks a foundational compromise in the law of outer space. Rather than excluding military activities altogether, it opened the way for an interpretation of “peaceful” as “non-aggressive”, allowing for the development of military uses short of the deployment of weapons of mass destruction. This interpretative evolution is reflected in Article IV of the Outer Space Treaty, which establishes a regime of partial, rather than comprehensive, demilitarisation in Earth orbits, while preserving a stricter regime of complete non-militarisation for celestial bodies.

THE PARTIAL DEMILITARISATION OF EARTH ORBITS

The legal regime governing military uses of Earth orbits derives primarily from Article IV (1) of the Outer Space Treaty. This provision does not establish a general prohibition on military activities in outer space. Instead, it lays down a specific and limited restriction, prohibiting only the placement in orbit around the Earth of nuclear weapons or any other kinds of weapons of mass destruction. This formulation reflects a compromise characteristic of the Cold War context. The objective was to prevent the extension of

nuclear confrontation into outer space, without excluding military uses of space as such. From a legal perspective, the notion of weapons of mass destruction is not explicitly defined in the treaty. However, it is generally understood, considering subsequent international practice to refer to nuclear, chemical and biological weapons, i.e. weapons capable of causing widespread, indiscriminate and large-scale destruction.

The regime of non-nuclearisation established by the Outer Space Treaty must be read in conjunction with other instruments of international law that reinforce, in a complementary manner, the exclusion of nuclear activities from the space environment. The Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (PTBT), opened for signature on 5 August 1963,⁴ constitutes the first major step in this direction. It prohibits nuclear test explosions in outer space well before the adoption of the Outer Space Treaty. This framework was subsequently reinforced by the Comprehensive Nuclear-Test-Ban Treaty (CTBT), opened for signature on 24 September 1996,⁵ which extends the prohibition to all nuclear explosions, in any environment.

An *a contrario* reading of Article IV (1) clarifies the limits of the prohibition on the militarisation of Earth orbits. Article IV (1) does not prohibit the transit of weapons of mass destruction through outer space. Intercontinental ballistic missiles (ICBMs), whose trajectories pass through outer space, are not covered by the prohibition, insofar as they are neither placed in orbit. The distinction between deployment and transit is therefore central to the interpretation of the provision and has been consistently reflected in State practice.

Apart from the specific prohibition of weapons of mass destruction laid down in Article IV (1), international space law does not prohibit weaponisation nor military uses of outer space as such.

This permissive framework has been reflected, first, in the long-standing integration of outer space into missile defence doctrines. The SDI, launched in 1983 under the presidency of Ronald Reagan, envisaged the deployment of space-based systems capable of intercepting ballistic missiles. Although

⁴ Partial Nuclear Test Ban Treaty.

⁵ Comprehensive Nuclear-Test-Ban Treaty.

the programme was never fully realised, it marked a decisive moment in the conceptualisation of outer space as a potential theatre for strategic defence. Under the presidency of Barack Obama, missile defence policy was not abandoned but rather reconfigured by adapting the technological and geographical scope of the system. More recently, the administration of Donald Trump reaffirmed the strategic importance of space in this domain, notably through the presentation in 2025 of the Iron Dome for America⁶ referred to in political discourse as a “Golden Dome”, a concept reflecting renewed interest in integrated and potentially space-enabled missile defence architectures.

Secondly, the permissive nature of the legal regime is illustrated by the continued practice of anti-satellite (ASAT) testing, which remains, in principle, lawful under the Outer Space Treaty. The destruction of satellites by China in 2007, by the United States in 2008, by India in 2019 and by Russia in 2021 – each targeting their own satellites – demonstrates that States have retained the capacity to develop and test space-denial capabilities, despite the well-documented risks associated with the generation of orbital debris.

Most significantly, however, the militarisation of outer space today is manifested less through the deployment of weapons in orbit than through the systematic use of space-based infrastructures in support of military operations conducted on Earth. Recent conflicts, and in particular the war in Ukraine since 2022, provide a particularly illustrative example. Space-based assets have played a decisive role in intelligence, surveillance and reconnaissance, enabling near real-time monitoring of troop movements and military infrastructure through both governmental and commercial satellite imagery. They have also ensured resilient communications capabilities in contested environments, notably through the deployment of satellite internet services such as those provided by Starlink, which have supported the operational continuity of Ukrainian forces despite disruptions to terrestrial networks. In addition, satellite navigation systems, including the Global Positioning System, have been essential for operational coordination and the use of precision-guided munitions. More broadly, the integration of space-derived

⁶ Executive Order 14186 of 27 January 2025.

data into command-and-control structures has significantly enhanced situational awareness and decision-making capabilities on the battlefield.

THE EXCLUSIVE PEACEFUL USES OF THE CELESTIAL BODIES

Article IV (1) of the Outer Space Treaty does not limit its scope to the prohibition of placing nuclear weapons or other weapons of mass destruction in Earth orbit. It also expressly prohibits States from installing such weapons on celestial bodies or stationing them in outer space in any other manner.

However, it is primarily Article IV (2) that constitutes the central reference for the legal regime governing the use of celestial bodies for military purposes. By requiring that the Moon and other celestial bodies be used exclusively for peaceful purposes, and by prohibiting the establishment of military bases, installations and fortifications, as well as the testing of weapons and the conduct of military manoeuvres, this paragraph lays down a regime of complete demilitarisation for celestial bodies, in contrast to the partial demilitarisation applicable to Earth orbits under Article IV (1).

However, the notion of “peaceful purposes” is not construed in a strictly literal sense. The treaty adopts a functional interpretation of peacefulness, whereby the decisive criterion lies in the purpose of the activity rather than in the status of the actors or the origin of the means employed. Indeed, the provision clarifies that the use of military personnel for scientific research or for any other peaceful purpose is not prohibited, nor is the use of equipment or facilities necessary for peaceful exploration, even where such equipment is of a military nature.

The indirect legal framework governing military activities through general principles of Space Law

While its preamble refers to the peaceful use of outer space, the Outer Space Treaty does not revolve solely around military issues, but rather establishes

a comprehensive legal framework applicable to all space activities. Most of its core principles had, in fact, already been articulated in the 1963 Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space.⁷

While Article IV permits, to a large extent, the conduct of military space activities, by reserving a regime of complete demilitarisation for celestial bodies, these activities are embedded in a broader normative framework derived from other provisions of the Treaty. On the one hand, military uses of outer space benefit from a relatively liberal interpretation of the rules governing the legal status of outer space, in particular the principles of freedom of use and non-appropriation, which allow States to deploy and operate military assets in orbit. On the other hand, these same activities remain subject to a set of general obligations, in particular due regard, international responsibility, and liability that shape and constrain the manner in which military space operations may be conducted.

*The legal status of outer space as a domain open
to all uses, including military activities*

The principle of the freedom of exploration and use of outer space, enshrined in Article I of the Outer Space Treaty, constitutes the cornerstone of the legal status of outer space. The provision establishes that outer space “shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law”.⁸ Through this formulation, the treaty defines outer space as an open-access domain, in which no category of activity is excluded *per se*, subject to compliance with applicable legal norms.

This principle is of particular importance for the assessment of military activities in outer space. The text of Article I does not distinguish between civilian and military uses, nor does it restrict the purposes for which space may be utilised. In the absence of an explicit prohibition, save for the specific

⁷ UNGA Res. 1962 (XVIII).

⁸ Outer Space Treaty, Article I.

limitations relating to weapons of mass destruction under Article IV, military activities must therefore be regarded as in principle admissible under the freedom of use. This interpretation is consistent with the subsequent State practice, which has seen the progressive integration of space-based capabilities into national security strategies without any general claim of illegality.

However, the freedom of use is not formulated in absolute terms. Article I further provides that the exploration and use of outer space shall be carried out “for the benefit and in the interests of all countries”, and that such exploration and use shall be the “province of all mankind”. These formulations introduce a normative dimension that may appear, at first glance, to qualify or limit the exercise of the freedom of use. In particular, they raise the question whether activities primarily driven by national strategic interests, such as military uses, can be reconciled with the requirement to act in the interests of the international community as a whole.

Such a reading, however, is not supported by State practice. Since the entry into force of the treaty, the development of military space capabilities has proceeded without being considered incompatible with Article I. The absence of sustained protest or legal challenge indicates that the “benefit and interests of all countries” clause has not been understood as imposing a concrete or enforceable obligation capable of restricting specific categories of activities. Accordingly, it may be argued that, so long as such activities remain consistent with general international law, most notably the rules governing the use of force, they cannot be considered contrary to the “interests of all countries”. The clause thus operates not as a direct legal constraint, but as a contextual standard, framing the exercise of freedoms within a broader requirement of compatibility with international peace and security.

Complementing the principle of freedom of use, Article II of the Outer Space Treaty establishes the rule of non-appropriation, according to which outer space, including the Moon and other celestial bodies, is not subject to national appropriation “by claim of sovereignty, by means of use or occupation, or by any other means”. This provision constitutes a foundational element of the legal status of outer space, as it excludes the extension of

territorial jurisdiction or control beyond the Earth. Read in conjunction with Article I, the non-appropriation principle contributes to defining outer space as a non-territorialised domain, characterised by openness and the absence of exclusive sovereign rights.

The implications of this principle are particularly significant for the assessment of military activities. Although Article II does not prohibit the deployment or operation of space systems for strategic or defence purposes, it prevents States from asserting exclusive rights over portions of outer space based on their activities. In this respect, the non-appropriation principle operates as a structural limitation on the spatial dimension of power projection. While States may develop and deploy capabilities that allow them to monitor, access, or influence specific areas from space, they cannot translate such capabilities into legal entitlements over the space environment itself. This distinction preserves the openness of outer space while accommodating the reality of strategic competition.

The constraints arising from general obligations

Outer space is open to all uses, including military activities. This does not mean that such activities are free from legal constraints. They are governed by a set of general obligations. These obligations do not prohibit military uses as such. They define how these activities must be conducted.

Article III of the Outer Space Treaty plays a central role. It requires that activities in outer space be carried out in accordance with international law, including the Charter of the United Nations. Outer space is therefore not a separate legal sphere. Military activities in space remain subject to the law on the use of force. In principle, a State may invoke the right of self-defence under Article 51 of the UN Charter. This may apply to attacks against space systems. However, the operational application of this right in outer space is uncertain. It is difficult to qualify an “armed attack” in this context. Attribution is often complex. Furthermore, any system is dual-use. It is not always possible to distinguish between civilian and military functions. In addition, defensive actions may create debris. These effects can extend

beyond the initial target. They may affect other States. For these reasons, Article III confirms the applicability of international law but does not provide clear operational guidance. Article III also raises the question of the application of international humanitarian law. In situations of armed conflict, this body of law applies in addition to the rules on the use of force. This includes the principles of distinction, proportionality and precautions in attack, which are to be applied to protect the civilian population and civilian objects. Their application to space activities is not straightforward. Dual-use satellites are a central issue. They may constitute legitimate military objectives if they make an effective contribution to military action. At the same time, their destruction may affect civilian services, such as communications or navigation. This creates a risk of indiscriminate effects. It also raises questions under the proportionality principle. The expected military advantage must be balanced against the potential harm to civilian uses. The applicability of general international law to outer space activities also encompasses restrictions relating to war propaganda. The Preamble of the Outer Space Treaty expressly refers to UN General Assembly Resolution 110 (II), which condemns “all forms of propaganda [...] designed or likely to provoke or encourage any threat to the peace, breach of the peace, or act of aggression”,⁹ and affirms its applicability to outer space. This reference reflects the historical context in which the Treaty was adopted. During the Cold War, international broadcasting was a particularly sensitive issue, especially as satellites became key vectors for global radio and television dissemination, and even more so with the emergence of direct broadcasting satellites in the 1970s.

Article IX introduces a more specific constraint. States must act with due regard to the interests of other States and avoid harmful interference. This obligation applies to all space activities, including military operations. It has direct operational implications. In practice, military space activities may create situations of proximity or interference. This is particularly visible with inspection or intelligence satellites operating close to other space objects. The case of the Russian satellite *Luch-Olymp*, which manoeuvred in close

⁹ UNGA Res. 110 (II), para. 1.

proximity to the Franco–Italian satellite *Athena-Fidus* in 2017, illustrates this situation. These manoeuvres were publicly disclosed by the French Minister of the Armed Forces, Florence Parly, in a speech delivered on 7 September 2018.¹⁰ Such behaviour may be justified on strategic or intelligence grounds. However, it raises questions under Article IX. Close approaches may pose a risk of interference or disruption. They may also be perceived as hostile. Article IX, therefore, introduces a standard of conduct. It does not prohibit such operations, but it requires States to consider their impact and, where appropriate, to engage in consultations. This requirement appears difficult to reconcile with intelligence or espionage missions, which, by nature, are discreet and do not lend themselves to prior consultation. The same reasoning applies to anti-satellite (ASAT) weapons, particularly those involving the destruction of space objects. Such weapons generate debris which may persist in orbit and affect other satellites. In this context, the use of systems capable of neutralising a satellite without destroying it, such as directed energy systems or electromagnetic interference techniques, including jamming, may appear more consistent with these obligations, as they limit the generation of debris and reduce the risk of long-term interference with other space activities.

This logic of prevention of harmful interference is reflected in the development of “safety zones”, as set out in Principle 11 of the Artemis Accords on Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes (Artemis Accords), first signed on 13 October 2020.¹¹ These zones are explicitly presented as an application of Article IX. They aim to prevent harmful interference by ensuring a certain separation between activities. This development is not entirely without precedent. In the field of space telecommunications, and particularly in the management of the geostationary orbit under the framework of the International Telecommunication Union (ITU), operators are assigned specific orbital positions associated with defined frequency rights. In practice, this has led to the emergence of so-called “orbital slots” or “boxes”,

¹⁰ Le Monde 2018.

¹¹ Artemis Accords, Section 11.

within which satellites operate while maintaining a certain separation from neighbouring systems to avoid harmful interference. However, the extension of such mechanisms to military activities raises specific issues. A State could seek to establish a safety zone around sensitive military operations, to limit the proximity of other actors. While this may be justified under Article IX, it cannot lead to a form of appropriation by occupation prohibited under Article II of the Outer Space Treaty. Safety zones must therefore remain temporary, proportionate and non-exclusive in intent.

Article X introduces a form of transparency and confidence-building. It provides that States Parties shall consider, on a basis of equality, requests from other States to be given an opportunity to observe the flight of space objects.¹² The purpose is to promote openness and to reduce mistrust between States. However, this mechanism remains limited in scope. First, it is based on a request and consent logic. A State may ask to observe a space activity, but the State conducting the activity is only required to “consider” the request. There is no obligation to accept it. Second, the treaty specifies that such observation must be arranged “to the greatest extent feasible and practicable”. This introduces a wide margin of discretion. States may invoke technical, operational or security reasons to refuse access. In addition, the practical implementation of this provision raises difficulties. Space activities, and in particular military operations, are often sensitive. They involve technologies and information that States are not willing to disclose. Observation of space objects in flight is also technically complex. It requires access to facilities, data or trajectories that are not easily shared. As a result, Article X does not establish a strong system of verification or control. It therefore has limited impact on military activities in outer space. This provision nevertheless reflects an important idea. The exploration and use of outer space should not be conducted in complete secrecy.

Articles VI and VII complete this framework. They establish State responsibility and liability. States are responsible for national activities in outer space. This includes military activities. They must authorise and supervise these activities when conducted by private operators. They are

¹² Outer Space Treaty, Article X.

also liable for damage caused by their space objects.¹³ These rules do not prohibit military uses, but impose accountability. They encourage States to control risks, especially in situations involving debris or interference.

CONCLUSION

The permissive nature of the Outer Space Treaty has, over time, contributed to the transformation of outer space into a domain of growing strategic competition, if not conflict, obscuring its fundamental character as a shared and inherently fragile environment. Any deliberate explosion in orbital regions populated by thousands of satellites may trigger cascading effects with catastrophic and long-lasting consequences. Likewise, non-kinetic operations targeting communication or Earth observation satellites may have severe repercussions on the ground, affecting populations that have become deeply dependent on space-based services for essential, and sometimes vital, needs. In this respect, current developments appear increasingly distant from the humanistic principles that inspired the adoption of the Treaty.

At a time of renewed strategic repositioning in space, the trajectory is deeply concerning. Threats to space assets have never been more significant, while discussions within international fora, particularly within the Conference on Disarmament, remain stalled on the issue of arms limitations in outer space. Yet, there is an urgent need to act in order to realign space activities with the foundational objectives of the Treaty, as recalled in its Preamble: “Recognizing the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes” and “[...] believing that the exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development.”

¹³ Outer Space Treaty, Articles VI, VII.

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Gábor Sulyok

SPACE SECURITY AND COLLECTIVE SECURITY: BASIC CONCEPTUAL RELATIONS

INTRODUCTION

The United Nations Security Council has recently failed to adopt its first resolutions directly concerning space security. The first draft resolution, prompted by troubling information, authored by two and co-sponsored by a large number of states, sought to reaffirm the long-standing obligation not to place nuclear weapons or any other kind of weapons of mass destruction in outer space.¹ In the course of the debate, two permanent members proposed an amendment to expand the scope of the text by calling for urgent measures to prevent the placement of any weapons in outer space and by urging the early elaboration of legally binding multilateral agreements to that effect.² The amendment, which would have extended far beyond the existing obligations of states, was turned down. The original draft resolution ultimately failed due to a negative vote cast by a permanent member,³ which later submitted its own draft resolution incorporating elements of the previously turned down amendment.⁴ This draft resolution was co-sponsored by a handful of states and suffered a similar fate, having failed

¹ Japan and United States of America et al.: Draft Resolution, 24 April 2024, UN Doc. S/2024/302.

² China and Russian Federation: Amendment to the Draft Resolution Contained in Document S/2024/302, 24 April 2024, UN Doc. S/2024/323.

³ United Nations Security Council, Provisional Verbatim Record, 24 April 2024, UN Doc. S/PV.9616, 5.

⁴ Belarus, China, Democratic People's Republic of Korea, Nicaragua, Russian Federation and Syrian Arab Republic: Draft Resolution, 20 May 2024, UN Doc. S/2024/383.

to obtain the required number of affirmative votes.⁵ The General Assembly held a debate on the exercise of the right to veto, as explicitly required by an earlier resolution.⁶ For a while, it appeared that the debate had concluded the sharp diplomatic exchange in the two principal organs, but the following year brought another round of lawfare over matters of space security.⁷ The General Assembly's First Committee held a side event hosted by the permanent member, which resorted to its veto power in the previous year, and two additional members that focused on the challenges and threats posed by low orbit satellite internet systems for international peace and security.⁸ The side event was followed shortly by an Arria-formula meeting of members of the Security Council. This informal discussion, convened by the same permanent member, also focused on the risks and challenges posed by the uncontrolled use of low Earth orbit satellites and resulted in a heated debate, along geopolitical fault lines, over the safety and security implications of large satellite constellations.⁹

The failure to adopt any of the draft resolutions and the tone of the subsequent debates came as no surprise in the prevailing geopolitical environment, but even these heavily and rightly criticised developments have positive aspects. The course of events clearly indicates the inextricable link between space security and collective security. It highlights the importance and untapped potential of the system of collective security at a time when outer space is becoming increasingly congested, contested and competitive.

⁵ United Nations Security Council, Provisional Verbatim Record, 20 May 2024, UN Doc. S/PV.9630, 4.

⁶ United Nations General Assembly, Verbatim Record, 6 May 2024, UN Doc. A/78/PV.78 and UN Doc. A/78/PV.79. See also the Standing Mandate for a General Assembly Debate When a Veto is Cast in the Security Council, G.A. Res. 76/262, 76 UN GAOR, Supp. No. 49 A/76/49 (Vol. III), 72.

⁷ AZCÁRATE ORTEGA – SAMSON 2023: 40; PEKKANEN–BLOUNT 2024.

⁸ United Nations General Assembly First Committee Side Event: Low Orbit Satellite Internet Systems in the Context of International Peace and Security: Challenges and Threats, 13 October 2025.

⁹ Permanent Mission of the Russian Federation to the United Nations: Risks and Challenges Emanating from the Uncontrolled Use of Low Earth Orbit Satellites, Concept Note, UN Security Council Arria-formula Meeting, 29 December 2025.

However, space security and collective security have developed distinct vocabularies. For that reason, the present study focuses on space security and collective security at a conceptual level. In order to promote a better understanding of that relationship, the analysis seeks to define and delineate the rather vague basic concepts of space security,¹⁰ in order to enable their positioning within the older and long-established conceptual framework of collective security. The concepts of space security and collective security that will be analysed include ‘space weapon’, ‘counterspace capability’, ‘irresponsible behaviour’ and ‘space threat’, as well as ‘use of force’, ‘threat of force’, ‘threat to the peace’, ‘breach of the peace’, ‘act of aggression’ and ‘armed attack’, respectively. The analysis primarily employs a linguistic, logical and functional approach, supplemented, as appropriate, by other techniques. The conclusions are expected to facilitate a more nuanced comprehension of the concepts concerned, thereby contributing to the ongoing scholarly dialogue on matters of space security.

SPACE SECURITY

The term ‘space weapon’ has long been used in professional and colloquial parlance. It probably ranks among the oldest of concepts of space security under deliberation, but agreement on a legally binding or generally accepted definition has not been achieved. Nevertheless, decades of international concern and scholarly attention have crystallised several core elements and facilitated the development of a taxonomy of space weapons. The United Nations General Assembly and the Conference on Disarmament, the single multilateral disarmament negotiating forum of the international community,¹¹ have had numerous opportunities to engage themselves with the concept when discussing the prevention of an arms race in outer space, or proposed amendments to the prevailing military provisions of space law, or proposed international treaties on the prohibition of the

¹⁰ AZCÁRATE ORTEGA 2026: 400–401, 413.

¹¹ Final Document of the Tenth Special Session of the General Assembly, G.A. Res. S-10/2, S-10 UN GAOR, Supp. No. 4 (A/S-10/4), 13.

stationing of weapons in outer space and/or the threat or use of force against space objects. Despite the absence of definitions in the more elaborate documents, including the draft additional protocol submitted by Italy in 1979¹² or the draft treaties submitted by the Soviet Union in 1981 and 1983,¹³ several early proposals presented coherent descriptions of the concept.¹⁴ These texts attest to a shared understanding that space weapons are devices, instruments or installations capable of destroying, damaging, disturbing the normal functioning or changing the flight trajectory of their targets. Further characteristics of space weapons appearing in these early texts include their offensive or defensive purposes, the possible locations of their deployment or targets, their operational components or encompassing systems, their underlying scientific principles, or their existing or prospective status. The actual details were obviously determined by the political and military objectives and considerations of submitting states. Expert proposals presented in the same period contain similar elements.¹⁵

The transition to a multipolar world order, the rapid pace of technological development and the emerging new space race provided new impetus to the old discourse on space weapons after the turn of the millennium. The Russian Federation continued the efforts to pursue the adoption of a legally

¹² Additional Protocol to 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” with a view to Preventing an Arms Race in Outer Space, 26 March 1979, Doc. CD/9.

¹³ Draft Treaty on the Prohibition of the Stationing of Weapons of Any Kind in Outer Space, Letter dated 10 August 1981 from the Minister for Foreign Affairs of the Union of Soviet Socialist Republics addressed to the Secretary-General, UN Doc. A/36/192, Annex; Treaty on the Prohibition of the Use of Force in Outer Space and from Space against the Earth, Letter dated 19 August 1983 from the First Vice-Chairman of the Council of Ministers of the Union of Soviet Socialist Republics, Minister for Foreign Affairs of the USSR, to the Secretary-General, UN Doc. A/38/194, Annex.

¹⁴ Draft Definition of Space Strike Weapons, 22 July 1986, Doc. CD/OS/WP.13/Rev.1; Compilation of Definitions of Space Weapons, 21 July 1986 and 29 July 1986, Doc. CD/OS/WP.14/Rev.1 and Add.1. See also WOLTER 2006: 29–30.

¹⁵ Union of Concerned Scientists et al.: A Treaty Limiting Anti-Satellite Weapons, May 1983, in GARWIN–PIKE 1984: 105; FISCHER, Horst et al.: Proposed Draft Treaty on the Limitation of the Military Use of Outer Space, July 1984, in SCHEFFRAN 2021: 170–174.

binding instrument, an objective that received increasing support from the People's Republic of China. Position and working papers submitted by the latter emphasised the importance of clear definitions, and formulated the following tentative descriptions:

Weapons are devices or facilities that strike, destroy or disrupt the normal functions of a target directly by various destructive ways. Weapon systems are the collective of weapons and their indispensably linked parts that jointly accomplish battle missions. Components of weapon systems are subsystems that [are] directly and indispensably involved in accomplishing battle missions.¹⁶

The following year, the two space powers tabled, with the support of a small group of like-minded countries, a working paper on possible elements of a future international treaty. The unofficial annex to that document reiterated the importance of definitions and proposed that any description of relevant weapons should focus on them being components of a system, their intended effects, and how they achieve those effects.¹⁷

These concerted efforts resulted, a few years later, in the Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects, commonly known as the Draft PPWT. The People's Republic of China and the Russian Federation submitted the original version of the proposed instrument to the Conference on Disarmament in 2008. This version expressly defined 'weapons in outer space' as "any device placed in outer space, based on any physical principle, specially produced or converted to eliminate, damage or disrupt normal function of objects in outer space, on the Earth or in its air, as well as to

¹⁶ Possible Elements of the Future International Legal Instrument on the Prevention of the Weaponization of Outer Space, 7 June 2001, Doc. CD/1645, IV. (Insert added).

¹⁷ Possible Elements for a Future International Legal Agreement on the Prevention of the Deployment of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects, 23 June 2002, Doc. CD/1679, Unofficial Annex: Compilation of Comments and Suggestions to the CD Working Paper CD/1679, 31 July 2003, II.2. See also LEWIS 2007: 171–192.

eliminate population, components of biosphere critical to human existence or inflict damage to them”.¹⁸ The ‘placement’ of weapons in outer space was intended to cover devices completing at least one orbit around our planet, devices following a section of an orbit before leaving that orbit, and devices permanently stationed somewhere in outer space.¹⁹ The document raised concerns and prompted criticism; therefore, an updated version was submitted in 2014. The definition was retained with some modifications. The updated version defines ‘weapon in outer space’ as “any outer space object or component thereof which has been produced or converted to destroy, damage or disrupt the normal functioning of objects in outer space, on the Earth’s surface or in its atmosphere, or to eliminate human beings or components of the biosphere which are important to human existence, or to inflict damage on them by using any principles of physics”.²⁰ The meaning of placement in outer space is identical to the original version, although the formulation of the third scenario has been refined as permanently located “in outer space or on any celestial bodies other than the Earth”.²¹

¹⁸ Draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects, Letter dated 12 February 2008 from the Permanent Representative of the Russian Federation and the Permanent Representative of China to the Conference on Disarmament addressed to the Secretary-General of the Conference, Doc. CD/1839, Article I (c).

¹⁹ Draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects, Letter dated 12 February 2008 from the Permanent Representative of the Russian Federation and the Permanent Representative of China to the Conference on Disarmament addressed to the Secretary-General of the Conference, Doc. CD/1839, Article I (d).

²⁰ Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects, Letter dated 10 June 2014 from the Permanent Representative of the Russian Federation and the Permanent Representative of China to the Conference on Disarmament addressed to the Acting Secretary-General of the Conference, Doc. CD/1985, Article I (b).

²¹ Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects, Letter dated 10 June 2014 from the Permanent Representative of the Russian Federation and the Permanent Representative of China to the Conference on Disarmament addressed to the Acting Secretary-General of the Conference, Doc. CD/1985, Article I (c).

Both definitions cover any weapon located in outer space, including the Moon and other celestial bodies, weaponised dual-use or dual-purpose assets, as well as fractional orbital bombardment systems. Direct-ascent anti-satellite missiles, on the other hand, are not covered despite the grave threat they pose.²² The conspicuous exclusion of such missiles is criticised as a major and dangerous shortcoming.²³ The European Union's Draft Codes of Conduct for Outer Space Activities, published in 2008 and 2014, do not contain a definition of space weapon either.²⁴

The absence of consensus on a definition does not preclude the taxonomy of space weapons, whether past or present, planned or built, experimental or operational, deployed or decommissioned, or tested or used. Space weapons can be deployed on land, at sea, in the air or in outer space. The possible locations of their targets are essentially identical. Targets can be located on land, at sea, in the air or in outer space.²⁵ The location of deployment and the location of the target collectively determine the potential directions of their application: Earth to outer space, outer space to Earth, and outer space to outer space. It should be noted that any weapon deployed on the planet that only traverses outer space on the way to its designated target located elsewhere on the planet is not regarded as a space weapon. Hence, ballistic missiles or hypersonic glide vehicles are not space weapons. Similarly to other weapons, space weapons can be divided into two main categories, weapons of mass destruction and conventional weapons. Weapons of mass destruction include nuclear weapons, biological weapons, chemical weapons and radiological weapons. The present catalogue is not exhaustive, technological development may extend its scope in the future. Conventional weapons can be further divided into kinetic and non-kinetic weapons; the

²² Destructive Direct-ascent Anti-satellite Missile Testing, G.A. Res. 77/41, 77 UN GAOR Supp. No. 49 A/77/49 (Vol. I), 225.

²³ BARTÓKI-GÖNCZY 2026: 367.

²⁴ Draft Code of Conduct for Outer Space Activities, 8–9 December 2008, Council Conclusions and Draft Code of Conduct for Outer Space Activities, 17 December 2008, 17175/08, Annex II; Draft International Code of Conduct for Outer Space Activities, 31 March 2014.

²⁵ United Nations Institute for Disarmament Research 1987: 17.

latter subcategory includes directed energy weapons, devices of electronic warfare and devices of cyber operations. Finally, in terms of effects, space weapons can have permanent or temporary, or hard-kill and soft-kill effects. The development, testing, production, manufacturing, acquisition, possession, retention, stockpiling, transfer of, or transfer control over such weapons, or the reception of transfer of, or control over such weapons, may or may not be lawful, depending on the international obligations assumed by the state concerned. The same holds for providing assistance, encouragement or inducement to anyone, or to seeking or receiving assistance from anyone to engage in any of these activities. States are expected to assess whether the employment of a new space weapon would be prohibited under the law of armed conflict.²⁶ The taxonomy of space weapons, along with selected examples of actual or conceived weapons, is displayed in Table 1.

The terminological complexity is exacerbated by the frequently used, but more recent term, ‘counterspace capability’. This expression also lacks a legally binding or generally accepted definition. The relevant literature describes counterspace capabilities in a variety of ways. For example, ‘counterspace’ or ‘space control’ is defined as capabilities or techniques used to gain space superiority, which is the capability of an actor to use outer space for its own purposes and to deny that to its adversary for a limited time and location.²⁷ The same concept is also defined as capacities, techniques or assets deliberately used to deceive, disrupt, deny, degrade or destroy space objects or space systems of an adversary.²⁸ Space systems comprise the space segment, the ground segment, the user segment and the data links: uplink, crosslink and downlink. A distinction is made between offensive and defensive, destructive and non-destructive, and reversible and non-reversible capabilities. Possible subcategories of such capabilities include kinetic, non-kinetic, direct-ascent, co-orbital, electronic warfare, directed energy and cyber capabilities.²⁹ For these reasons, the conceptual relationship of ‘space weapon’ and ‘counterspace capability’ is hard to establish. Depending

²⁶ DINSTEIN-DAHL 2020: 6–7.

²⁷ SAMSON-WEEDEN 2024: xxxvii.

²⁸ AZCÁRATE ORTEGA – SAMSON 2023: 28.

²⁹ SAMSON-WEEDEN 2024: xxxviii; AZCÁRATE ORTEGA – SAMSON 2023: 28–30.

Table 1. *Classification of space weapons**

Deployment	Target	Mass destruction	Conventional	Effect
			<i>Kinetic</i>	<i>Non-kinetic</i>
			<i>Directed-energy</i>	<i>Electronic warfare</i>
land	land	nuclear	sun gun/heliobeam	jamming
sea	sea	biological	laser	uplink
air	air	chemical	particle beam	downlink
outer space	outer space	radiological	plasma	crosslink
			microwave	spoofing
			electromagnetic pulse	meaconing
				signal intrusion
			<i>Kinetic</i>	
			handgun	
			cannon	
			kill vehicle	
			projectile launcher	
			docking mechanism	
			robotic arm	
			anti-satellite missile	
			direct-ascent	
			co-orbital	
			electromagnetic launcher	
			rail gun	
			coil gun	
			spraying mechanism	
			chemicals	
			paint	
			kinetic orbital bombardment	
			meteoroid	
			hypervelocity rod bundles	
<i>Direction</i>				
Earth to outer space				<i>Cyber operations</i>
Earth through outer space to Earth**				data interception
outer space to Earth				data monitoring
outer space to outer space				data corruption
				seizure of control

Notes: * Military, dual-use or dual-purpose spaceplanes, spacecraft and space stations may be equipped with most of these weapons. ** Not considered space weapons.

Source: Compiled by the author.

on the user and context, the terms may or may not seem interchangeable.³⁰ Nevertheless, the natural meanings of the components of these two adjectival structures may facilitate a degree of conceptual clarity. The meaning of ‘counterspace’ appears to be narrower than that of ‘space’. If the prefix is not superfluous in ‘counterspace’, its meaning cannot be equated with ‘space’ and must be more limited. The meaning of ‘capability’, on the other hand, appears to be much broader than that of ‘weapon’. In fact, space weapons are the primary, but not exclusive, means by which a state or non-state entity may acquire counterspace capabilities. Therefore, the terms concerned are in a complex relationship and should not be regarded as being synonymous or being in a part–whole relationship.

However, the mere possession of counterspace capabilities is not necessarily unlawful or a serious problem. It is the combination of capabilities and behaviours of a state or a non-state entity that may pose a threat to space security. This realisation has prompted a recent shift of focus from capabilities to behaviours. Focusing on behaviours does not entail the disregard of capabilities, but has, among others, the benefit of being able to address the challenge posed by dual-use and dual-purpose assets.³¹ This holistic approach is based on a landmark UN General Assembly resolution,³² and characterises the activities of the Open-ended Working Group on Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours.³³ Even though the working group was unable to adopt a final report, the process has turned the attention towards the concept of ‘irresponsible behaviour’. These efforts have produced a range of documents, including the UN Secretary-General’s report on reducing space threats, the Open-ended Working Group’s unadopted draft reports, and the Chairperson’s summary, which outline what contributing states

³⁰ AZCÁRATE ORTEGA 2026: 397.

³¹ AZCÁRATE ORTEGA – ERICKSON 2024: 16.

³² Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, G.A. Res. 75/36, 75 UN GAOR, Supp. No. 49 A/75/49 (Vol. I), 238.

³³ Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, G.A. Res. 76/231, 76 UN GAOR, Supp. No. 49 A/76/49 (Vol. I), 299.

consider to be possibly irresponsible behaviours in outer space.³⁴ For example, behaviours related to space debris include anti-satellite weapon tests or simulations, the damaging or destruction of satellites, and threats of damaging or destruction of satellites.³⁵ Behaviours related to weapons include the development of counterspace capabilities, the placement of weapons in outer space, and the destructive use of space objects.³⁶ Behaviours related to interference include interference with normal operations, interference with military space systems, interference with command and control, disruption or impairment of space services, disruption of situational awareness systems, jamming, spoofing or cyber operations, and the use of laser dazzling or chemical sprays.³⁷ Behaviours relating to other space operations include intentional collisions of space objects, the hindering of orbital movement, the failure to perform avoidance manoeuvres, irregular movements in geostationary orbit, uncoordinated activities, tests or exercises, the uncoordinated release of objects, and the failure to deorbit satellites.³⁸ Behaviours relating to information include the failure to provide information on satellites or extraordinary activities, the failure to declare service or mission purposes, the lack of transparency on ambiguous behaviours, the sharing of misleading information, and the reporting of unprovable hostile

³⁴ Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, Report of the Secretary-General, 13 July 2021, UN Doc. A/76/77; Draft Report of the Open-ended Working Group on Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, 18 August 2023 and 31 August 2023, UN Doc. A/AC.294/2023/CRP.1 and UN Doc. A/AC.294/2023/CRP.1/Rev.1; Chairperson's Summary, Open-ended Working Group on Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, 1 September 2023, UN Doc. A/AC.294/2023/WP.22.

³⁵ Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, Report of the Secretary-General, 13 July 2021, UN Doc. A/76/77, para. 19 (a).

³⁶ Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, Report of the Secretary-General, 13 July 2021, UN Doc. A/76/77, para. 19 (b).

³⁷ Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, Report of the Secretary-General, 13 July 2021, UN Doc. A/76/77, para. 19 (c).

³⁸ Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, Report of the Secretary-General, 13 July 2021, UN Doc. A/76/77, para. 19 (d).

acts.³⁹ Behaviours relating to rendezvous and proximity operations include a lack of transparency or prior communication, and a lack of consent or cooperation.⁴⁰ Miscellaneous other behaviours include the unnecessary overpopulation of orbits or frequency bands, the underestimation of the impact of new programmes, the delegation of control to non-certified or unqualified parties, the improper operation or placement of unpermitted technology, the use of low-cost or low-resilience components, the use of insufficiently cyberresilient ground segments or data links, and the use of nuclear power sources contrary to relevant guidelines and principles.⁴¹ These actions, activities or omissions may or may not be lawful, but could be regarded as equally irresponsible from the perspective of space security.

‘Space threats’ also emerge from the intersection of capabilities and certain behaviours. The concept of space threat is relatively old, but it also lacks a legally binding or generally accepted definition. The difficulties in defining the concept are primarily related to the inescapable subjectivity of threat perception and the dual-use or dual-purpose nature of most space objects. There are fundamental differences in how stakeholders perceive, assess and react to threats. This absence of a shared understanding is evident even among allied or like-minded countries. Furthermore, space threats should not be treated in isolation. Since the space domain cannot and should not be separated from the land, maritime, air and cyber domains, the identification and assessment of these threats require a holistic approach and a comprehensive analysis.⁴² Nevertheless, policy documents and the relevant literature facilitate the clarification of basic characteristics of space threats.

³⁹ Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, Report of the Secretary-General, 13 July 2021, UN Doc. A/76/77, para. 19 (e).

⁴⁰ Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, Report of the Secretary-General, 13 July 2021, UN Doc. A/76/77, para. 19 (f).

⁴¹ Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, Report of the Secretary-General, 13 July 2021, UN Doc. A/76/77, para. 19 (g).

⁴² COTICCHIA 2024: 107–108.

Space threats are intentional conducts or deliberately created situations that target a space system or any of its components.⁴³ It should be recalled that space systems should be broadly understood to include the space segment, the ground segment, the user segment and the data links. The potential directions of these threats are as follows: Earth to outer space, outer space to Earth, outer space to outer space, and Earth through outer space to Earth. This last direction, as mentioned, is mostly excluded from the concept of a space weapon, but it should, by all means, be taken into consideration in the context of space threats. The conducts and situations that constitute space threats are inherently hostile, may vary in terms of gravity or intensity, and may utilise a range of low-end non-kinetic or high-end kinetic counterspace capabilities. However, they do not necessarily involve actual recourse to space weapons. These hostile conducts or situations are intended, as appropriate, to eavesdrop on, inspect, intercept, manipulate, deceive, disrupt, deny, degrade or destroy a space system or any of its components.⁴⁴ Their effects can be reversible or irreversible, temporary or permanent. Even though space threats are inherently hostile, the relevant conducts or situations may or may not be lawful. The European Union has grasped the essence of space threats with commendable brevity and clarity, stating that “space threats are intentionally hostile activities through counterspace capabilities”,⁴⁵ and its institutions are actively studying the possible scenarios and implications of the future development of space security.⁴⁶

⁴³ AZCÁRATE ORTEGA – SAMSON 2023: 41.

⁴⁴ NATO’s Overarching Space Policy, 27 June 2019, 2–4.

⁴⁵ European Union Space Strategy for Security and Defence, Joint Communication to the European Parliament and the Council, 10 March 2023, JOIN(2023) 9 final, 1.2.

⁴⁶ PATAKI 2025: 12–23.

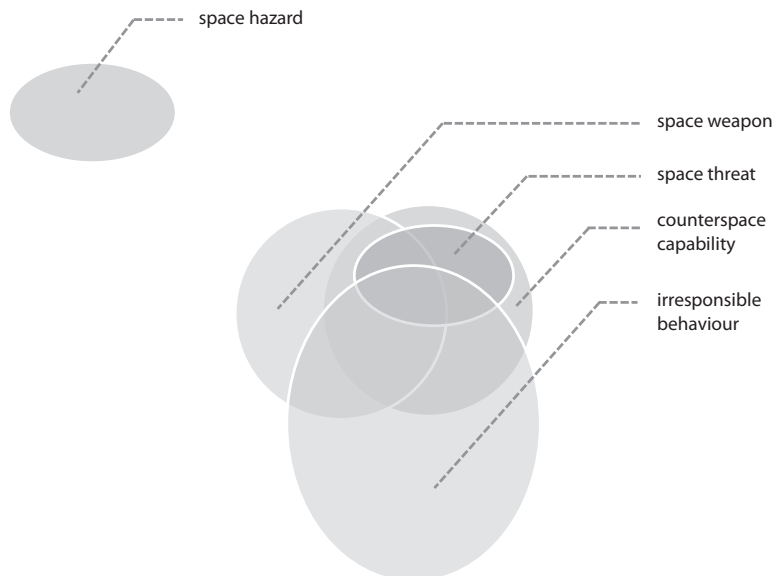


Figure 1. *Tentative relationship of concepts of space security*

Source: Compiled by the author.

Space threats should not be confused with ‘hazards’.⁴⁷ The distinction is far from being straightforward, as the latter concept also has numerous scopes and meanings that change with the context. In general, hazards are sources of harm originating from natural, human-induced or socio-natural factors. These processes, phenomena or activities can be single, sequential or combined, and have the potential to cause, among others, loss of life, personal injury, health impairment or property damage.⁴⁸ The likelihood of a hazard causing harm, and the severity of that harm, are described by the concept of risk. Unlike the previously discussed concepts, hazards

⁴⁷ Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours, Report of the Secretary-General, 13 July 2021, UN Doc. A/76/77, para. 9.

⁴⁸ Report of the Open-ended Intergovernmental Expert Working Group on Indicators and Terminology relating to Disaster Risk Reduction, 1 December 2016, UN Doc. A/71/644, 18–19.

belong to the realm of space safety as opposed to space security.⁴⁹ In this context, the relevant hazards are mostly environmental or technological, and include solar storms, geomagnetic storms, cosmic radiation, technical incidents, various accidents, and micrometeorite or space debris impacts. While they have the potential to disrupt, damage, disable or destroy a space system or any of its components, for the sake of conceptual clarity, they should not be classified as space threats.

The four concepts appear to have distinct areas of focus: ‘space weapon’ focuses on means and use, ‘counterspace capability’ focuses on ability and impact, ‘irresponsible behaviour’ focuses on conduct and standards, and ‘space threat’ focuses on perception and strategic considerations. Their tentative relationship is displayed in Figure 1.

The concept of space weapon has one overlap with the concept of counterspace capability, one overlap with the concept of irresponsible behaviour, one triple overlap with the concepts of counterspace capability and irresponsible behaviour, one triple overlap with the concepts of counterspace capability and space threat, and one quadruple overlap with the concepts of counterspace capability, irresponsible behaviour and space threat. The concept of counterspace capability has one overlap with the concept of space weapon, one overlap with the concept of irresponsible behaviour, one overlap with the concept of space threat, one triple overlap with the concepts of space weapon and irresponsible behaviour, one triple overlap with the concepts of space weapon and space threat, and one quadruple overlap with the concepts of space weapon, irresponsible behaviour and space threat. The concept of irresponsible behaviour has one overlap with the concept of space weapon, one overlap with the concept of counterspace capability, one triple overlap with the concepts of space weapon and counterspace capability, one triple overlap with the concepts of counterspace capability and space threat, and one quadruple overlap with the concepts of space weapon, counterspace capability and space threat. Finally, the concept of space threat forms a subset of the concept of counterspace capability. As such, it has one overlap with the concept of counterspace capability, one triple

⁴⁹ AZCÁRATE ORTEGA – SAMSON 2023: 39.

overlap with the concepts of space weapons and counterspace capability, one triple overlap with the concepts of counterspace capability and irresponsible behaviour, and one quadruple overlap with the concepts of space weapons, counterspace capability and irresponsible behaviour. The concepts of space weapon, counterspace capability and irresponsible behaviour also have non-overlapping cores, respectively. Examples are provided in Table 2. These examples reveal a correlation that the more overlaps exist between the concepts, the more severe the relevant conducts or situations become.

Table 2. *Examples of relevant conducts or situations*

Concepts of space security		
Overlap	Relationship	Examples
None	Space weapon	Development of space weapons Possession of space weapons
	Counterspace capability	Red teaming cybersecurity exercises Possession of rendezvous and proximity operation satellites
	Irresponsible behaviour	Irregular movements in geostationary orbit Reporting of unprovable hostile acts in orbit
	Space weapon + counterspace capability	Possession of anti-satellite weapons Possession of electronic warfare or cyber operation capabilities
Double	Space weapon + irresponsible behaviour	Uncoordinated release of objects from satellites Placement of orbital bombardment systems in outer space
	Counterspace capability + irresponsible behaviour	Unintentional disruption of satellite telecommunications Unintentional disruption of space situational awareness services
	Counterspace capability + space threat*	Placement of inspection satellites in close orbit Placement of rendezvous and proximity operation satellites in close orbit
	Space weapon + counterspace capability + irresponsible behaviour	Destructive test of direct-ascent anti-satellite missiles Nuclear weapon test explosions on other celestial bodies
Triple	Space weapon + counterspace capability + space threat	Deployment of direct-ascent anti-satellite missiles Placement of co-orbital killer satellites among space debris
	Counterspace capability + irresponsible behaviour + space threat	Intentional hindering of space objects in orbit Uncoordinated rendezvous and proximity operations
Quadruple	Space weapon + counterspace capability + irresponsible behaviour + space threat	Hostile and destructive use of space weapons against space systems Deliberate generation of space debris as methods or means of warfare

Note: *Space threats presuppose a certain level of threat perception.

Source: Compiled by the author.

COLLECTIVE SECURITY

The majority of basic concepts of collective security are contained in Chapters I and VII of the UN Charter, entitled “Purposes and Principles” and “Action with Respect to Threats to the Peace, Breaches of the Peace, and Acts of Aggression”, respectively. The obvious point of departure is the prohibition of the threat or use of force, a fundamental principle and peremptory norm of international law.⁵⁰ The Charter does not define the ‘use of force’ or ‘threat of force’, or any of their components, but the interpretation of related provisions, the practice of states and the relevant literature provide a solid basis for the clarification of its meaning. This meaning is centred and contingent on the meaning of ‘force’, which, in this context, is to be interpreted as armed or military force, even when the noun is not accompanied by a restrictive adjective.⁵¹ The use of force, therefore, refers to the physical application of armed or military force, regardless of the type of weapon used. Indeed, the use of force may also involve dual-use or dual-purpose means. However, the concept applies only to military actions by a state against another state; it does not cover civil wars, insurgencies, or other intra-state violence.⁵² These military actions may take place anywhere and in any operational domain, including cyberspace and outer space. It should be pointed out that the use of force is a comprehensive and objective concept. The use of force encompasses the categories of war and hostile measures short of war, as well as acts of aggression and armed attack. The determination of its existence is a matter of fact; the subjective reasons, motivations or considerations of states are irrelevant. Unlike the ‘use of force’, the ‘threat of force’ does not involve the physical application of armed or military force. Threats of force are explicit or implicit messages or promises from one state to another, which raise the credible prospect of the actual use of force should a demand not be complied with. These messages or promises may be delivered in writing or verbally, directly or indirectly, through a single act or a series of acts. However, the possession

⁵⁰ UN Charter, Article 2 (4).

⁵¹ RANDELZHOFFER–DÖRR 2012: 208; DÖRR 2019: [11].

⁵² RANDELZHOFFER–DÖRR 2012: 213–214; DÖRR 2019: [21].

of various weapons or weapon systems, *per se*, does not amount to a threat of force.⁵³ Examples include ultimatums, shows of force, military build-ups and general mobilisations. The threat or use of force is unlawful, except in the exercise of the right to individual or collective self-defence, or upon a prior and express authorisation by the Security Council under Chapter VII of the UN Charter.⁵⁴ These observations, like international law itself, also apply to the domain of outer space.⁵⁵

The UN Charter does not define any of the three concepts in the title of Chapter VII either. Instead, the Security Council is granted the power to determine whether a specific conduct or event constitutes a 'threat to the peace', a 'breach of the peace' or an 'act of aggression'.⁵⁶ This determination is based on an exceptionally broad discretion,⁵⁷ and forms an indispensable precondition for the taking of measures available under the chapter concerned.⁵⁸ From among the three concepts, 'threat to the peace' is undoubtedly the broadest. It can be applied to conducts or events between states, within states or not involving states, provided they pose a generic or specific threat to international peace and security. The threat does not necessarily involve recourse to weapons; a threat to peace is not synonymous with a threat of force.⁵⁹ Unsurprisingly, the Security Council favours this rather flexible and readily expandable category. It has already classified international and non-international armed conflicts, gross, systematic and widespread violations of international human rights and humanitarian law, massive flows of refugees towards and across international frontiers, all forms and manifestations of terrorism, the proliferation of weapons of mass destruction and their means of delivery, the illicit trafficking of drugs, small arms and light weapons and transnational organised crime, maritime

⁵³ KLECZKOWSKA 2023: 15–26; RANDELZHOFFER–DÖRR 2012: 217–218; WOOD 2013: [6]–[11].

⁵⁴ UN Charter, Articles 42, 51. See also DINSTEIN 2017: 195–378.

⁵⁵ BEARD–STEPHENS 2024: 201–238.

⁵⁶ UN Charter, Article 39.

⁵⁷ KRISCH 2012a: 1275–1276; CONFORTI 2005: 171–172.

⁵⁸ KELSEN 1951: 725; KRISCH 2012a: 1294–1295.

⁵⁹ UN Charter, Article 2 (4). See also KELSEN 1951: 727–728.

piracy and armed robbery, and the outbreak of epidemics and pandemics as threats to the peace.⁶⁰ More recently, the malicious use of information and communications technology has also been considered an evolving threat and a threat multiplier.⁶¹

‘Breach of peace’ is narrower than ‘threat to the peace’. Breaches of the peace mostly occur in cases of armed conflicts between states, armed conflicts between states and *de facto* regimes not recognised as states, and in cases of unlawful military occupation. In such cases, peace is not merely threatened, but manifestly violated.⁶² Since the Security Council is granted an exceptionally broad discretion in the interpretation of the concept, the potential scope of breaches of the peace appears to be broader than that of the use of force.⁶³ The principal organ has seldom used this category and has instead relied on the concept of threat to the peace. Determinations of the existence of ‘acts of aggression’ are even more sporadic. The concept of aggression is probably the oldest of the three concepts under deliberation and started to gain ground in international law in the first half of the previous century.⁶⁴ The UN Charter also contains the concept of aggression, alongside threat to the peace and breach of the peace, but leaves it undefined. However, a General Assembly resolution, adopted in 1974, provides a general definition and a non-exhaustive catalogue of relevant conducts.⁶⁵ It should be noted that the resolution is not legally binding and does not in any way affect the functions and powers of the Security Council. Nevertheless, it could be reasonably argued that the contents of the resolution reflect the common opinion of the international community. It contains the following definition:

⁶⁰ Repertoire of the Practice of the Security Council (<https://main.un.org/securitycouncil/en/content/repertoire/structure>).

⁶¹ Final Report of the Open-ended Working Group on Security of and in the Use of Information and Communications Technologies 2021–2025, 24 July 2025, UN Doc. A/80/257, paras. 22–25.

⁶² KELSEN 1951: 727; KRISCH 2012a: 1293.

⁶³ Cf. KAJTÁR 2015: 81.

⁶⁴ BROWNIE 1963: 351–360.

⁶⁵ Definition of Aggression, G.A. Res. 3314, 29 UN GAOR Supp. No. 31 A/9631 (Vol. I), 142.

Aggression is the use of armed force by a State against the sovereignty, territorial integrity or political independence of another State, or in any other manner inconsistent with the Charter of the United Nations [...]. The first use of armed force by a State in contravention of the Charter shall constitute *prima facie* evidence of an act of aggression [...].⁶⁶

The resolution submits that the following conducts may constitute acts of aggression, regardless of a declaration of war: the invasion or attack on the territory of another state by the armed forces of another state, any military occupation resulting from such an invasion or attack, or the annexation by the use of force of the territory of another state or any part thereof; the bombardment or the use of any weapon against the territory of another state; the blockade of ports or coasts of another state; any attack against the land, sea or air forces, or marine and air fleets of another state; the use of armed forces in the territory of another state in contravention of the conditions laid down in the agreement with the receiving state, or their extended presence in that territory after the termination of the agreement; the placement of a state's territory at the disposal of another state enabling the latter to perpetrate an act of aggression against a third state; the sending of armed bands, groups, irregulars or mercenaries by or on behalf of a state to carry out acts of armed force against another state the gravity of which amounts to the conducts listed above, or a state's substantial involvement therein.⁶⁷ The last conduct is often labelled 'indirect aggression', as opposed to the direct forms of aggression. The resolution also makes it clear that acts of aggression are, *per definitionem*, unlawful, and entail the international responsibility of the perpetrating state.⁶⁸ The planning, preparation, initiation or execution of acts of aggression by persons effectively exercising control over or directing the political or military actions of a state also entail individual criminal

⁶⁶ Definition of Aggression, Articles 1–2.

⁶⁷ Definition of Aggression, Articles 3–4.

⁶⁸ Definition of Aggression, Article 5 (2).

responsibility.⁶⁹ The examples above reveal that acts of aggression and breaches of the peace are in a part–whole relationship.⁷⁰

Since the Security Council is a political organ, the determination of the existence of a threat to the peace, a breach of the peace or an act of aggression is primarily a political and factual decision, not a legal one. The determination is based on the impact of a conduct or an event on international peace and security rather than on the lawfulness or unlawfulness thereof. Hence, the Security Council may take action even against lawful conducts or events, if it considers them impermissible from the perspective of international peace and security. For example, it may characterise such conducts or events as threats to the peace, and take appropriate measures to suppress them.⁷¹ Having determined that there exists a threat to the peace, a breach of the peace or an act of aggression, the Security Council has a range of options: it can make recommendations, adopt provisional measures, or take enforcement measures not involving or involving the use of armed force.⁷² The organ decides, at its discretion, which tools to use from its inventory and what form they should take. It also decides the sequence and duration in which the various tools should be used. The Security Council's practice reveals a tendency towards proportionality and gradualism, but this pragmatic approach may be set aside if the circumstances so require. The Security Council is not bound to apply the means at its disposal sequentially. These powers can also be exercised in the domain of outer space.⁷³

The UN Charter does not define 'armed attack' either; it only reveals that the victim of such an attack is a state.⁷⁴ However, the relevant theory and practice make it clear that an armed attack, as the 'overture' of a situation of

⁶⁹ Rome Statute of the International Criminal Court, Rome, 17 July 1998, 2187 UNTS 3, as amended by Resolution RC/Res. 6, Article 8bis (1).

⁷⁰ KELSEN 1951: 727.

⁷¹ HIGGINS 1963: 174, 226; KELSEN 1951: 728–730; KRISCH 2012b: 1245.

⁷² UN Charter, Articles 39–42.

⁷³ BEARD–STEPHENS 2024: 263–272.

⁷⁴ UN Charter, Article 51. The International Law Commission holds that an international organisation may also become a victim of an armed attack. Draft Articles on the Responsibility of International Organizations, Article 21, in Yearbook of the International Law Commission, 2011. Vol. II. Part Two, UN Doc. A/CN.4/SER.A/2011/Add.1 (Part 2), 40.

self-defence, possesses a quantitative and a qualitative element. The former characterises the gravity and intensity of the attack; the latter characterises the perpetrator of the attack.⁷⁵ Being a subset of the concept of aggression, an armed attack can be described as the gravest and most intensive manifestation of the use of force.⁷⁶ For the same reason, it is always unlawful. The nature of the weapons used in an armed attack is not relevant; it may be carried out even with dual-use or dual-purpose means.⁷⁷ The attack may take place in any of the operational domains, including cyberspace and outer space,⁷⁸ and may be constituted either by a grave and intensive singular act or by a series of attacks of lesser gravity, known as an ‘accumulation of events’.⁷⁹ Isolated events of minor gravity are not considered to be armed attacks, even if they claim human lives.⁸⁰ The traditional understanding of the concept holds that only conducts attributable to states can constitute armed attacks.⁸¹ Similarly to acts of aggression, an armed attack can be carried out either directly or indirectly. In the latter case, the attack is carried out by a person or a group of persons whose conduct is attributable to a state.⁸² However, in the recent decades there have been debates over whether conducts of

⁷⁵ Sulyok 2024: 395–397.

⁷⁶ Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America), Judgment of 27 June 1986, ICJ Reports 1986, 101.

⁷⁷ Marxsen 2025: [21].

⁷⁸ Beard–Stephens 2024: 250–262; Schmitt 2017: 339, 341–343; Jakhu–Free-land 2022: 22.

⁷⁹ Oil Platforms (Islamic Republic of Iran v. United States of America), Judgment of 6 November 2003, ICJ Reports 2003, 190–192; Armed Activities on the Territory of the Congo (Democratic Republic of the Congo v. Uganda), Judgment of 19 December 2005, ICJ Reports 2005, 219, 223.

⁸⁰ Eritrea–Ethiopia Claims Commission, Partial Award: Jus Ad Bellum–Ethiopia’s Claims 1–8, Decision of 19 December 2005, RIAA Vol. XXVI, 465.

⁸¹ Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory, Advisory Opinion of 9 July 2004, ICJ Reports 2004, 194.

⁸² Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America), Judgment of 27 June 1986, ICJ Reports 1986, 64–65; Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina v. Serbia and Montenegro), Judgment of 26 February 2007, ICJ Reports 2007, 208–210.

non-state actors that are not attributable to any state can constitute armed attacks. Equally debated is the so-called ‘unwilling or unable’ doctrine, which holds that self-defence is permissible against non-state actors carrying out attacks from the territory of another state, provided that state is unable or unwilling to put an end to these attacks.⁸³ The relationship of these terms is displayed in Figure 2. Theory and practice have clarified their meaning to an extent that the explanation of the conceptual relationship is a relatively straightforward task.

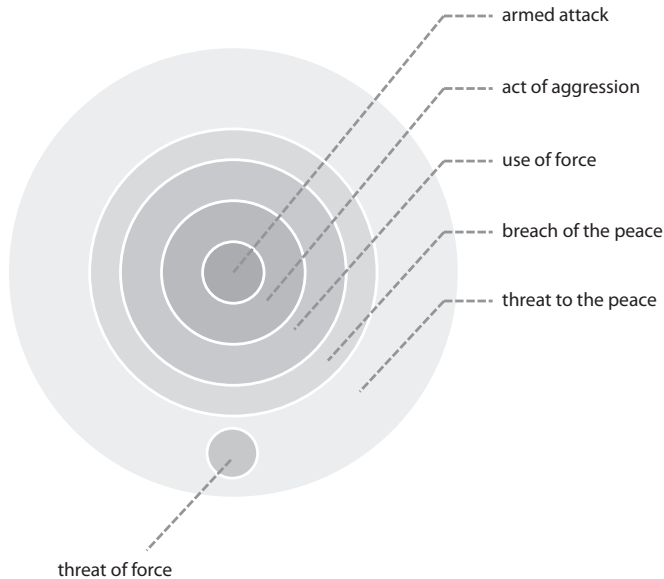


Figure 2. *Relationship of concepts of collective security*

Source: Compiled by the author.

⁸³ Letter dated 23 September 2014 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General, UN Doc. S/2014/695.

The relationship of these concepts can be illustrated by concentric circles, with the concept of armed attack forming the innermost circle and the concept of threat to the peace forming the outermost circle. The concepts are arranged in the following order from outside to inside: threat to the peace, breach of the peace, use of force, act of aggression and armed attack. This sequence represents not only a whole–part relationship between the concepts, but also an order of increasing severity of related conducts and situations. However, it should be pointed out that the concept of threat of force occupies a somewhat peculiar position in the depiction of conceptual relationship, and can arguably be described as a subset of threats to the peace. With the exception of threats to the peace, which may or may not be lawful, all other concepts describe concepts or situations that are by default unlawful.

CONCLUSIONS

The present study has focused on space security and collective security at a conceptual level in order to define and delineate the basic concepts of space security and to enable the positioning of these concepts within the conceptual framework of collective security. The concepts of space security and collective security analysed include ‘space weapon’, ‘counterspace capability’, ‘irresponsible behaviour’ and ‘space threat’, as well as ‘use of force’, ‘threat of force’, ‘threat to the peace’, ‘breach of the peace’, ‘act of aggression’ and ‘armed attack’, respectively. The analysis intended to promote a better understanding of these concepts and their relationships, and to contribute to the ongoing scholarly dialogue on matters of space security. It should be emphasised that the conclusions reached as a result of the analysis are inevitably tentative, owing to the fact that none of the concepts has a universally accepted or a legally binding definition.

The analysis revealed a correlation between the concepts of space security, indicating that the more overlaps exist between these concepts, the more severe the relevant conducts or situations become. However, the level of severity does not coincide with the lawfulness or unlawfulness of these

conducts or situations. The legal assessment of conducts or situations described by the concepts of space security has to be performed against the backdrop of the prevailing rules and principles of international law, particularly of the prohibition of the threat or use of force, guided by the fundamental principle that international law also applies to outer space. This is where the concepts of collective security come into play. Their meaning and conceptual relationship are incomparably easier to understand than those of the concepts of space security, even when the exceptionally broad discretion of the UN Security Council in their interpretation and application is factored in. Therefore, these concepts serve as a reasonably reliable compass for the legal assessment of relevant conducts or situations, with the notable exception of conducts or situations that constitute threats to the peace, which may or may not be lawful under international law.

Having established the relationship between the basic concepts of space security and collective security, it would seem logical to conclude by superimposing the former on the latter. While certain general observations could probably be formulated, they would be exceedingly abstract. Hence, a more practical approach would be to assess the conducts or situations of concern to space security on a case-by-case basis, taking into account the circumstances of each case. Indeed, such an objective assessment should be provided by the scholarly community whenever possible. Experience gained from specific cases would facilitate the identification of general perceptions, patterns or tendencies, thereby informing the behaviour of states and other stakeholders in the critical field of space security.

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Charline Coudry

NEUTRALITY LAW AND SPACE ASSETS:
A FRAMEWORK FOR PROTECTION
OR A SOURCE OF ESCALATION?

INTRODUCTION

The law of neutrality merits renewed attention in an era marked by the Security Council's paralysis and broader institutional dysfunction within the United Nations. This century-old framework, which Stephen Neff describes as uniting "the idealism of the pacifist with the sharp commercial eye of the arm dealer",¹ has traditionally regulated terrestrial and maritime warfare. Yet, as contemporary armed conflicts increasingly involve outer space, a critical question arises: Can neutrality law effectively protect space assets and stabilise conflict dynamics, or does its application to this novel domain risk generating legal ambiguity and escalation?

Through centuries of State practice, the law of neutrality emerged and came to be codified in the 1907 Hague Convention (V) respecting the Rights and Duties of Neutral Powers and Persons in Case of War on Land and in the Hague Convention (XIII) concerning the Rights and Duties of Neutral Powers in Naval War.² These two texts constitute to date "the main body of the law of neutrality and codify to a large extent the applicable rights and obligations of neutral states in conflict".³

The law of neutrality has formed a structural component of the international legal order governing armed conflict. Though modified, many references remain to this regime that delineate the legal boundaries between those States engaged in hostilities, the belligerents, and those that abstain,

¹ NEFF 2022: 3–5.

² SCHINDLER 1991: 225.

³ SEGER 2014: 249.

the neutrals.⁴ This binary distinction, codified in the Hague Conventions of 1907, is a matter of legal status: in the classical view, once an international armed conflict arises,⁵ every third State is presumed neutral unless and until it crosses the threshold of participation.⁶

Historically, the notion of war was conceived as a highly formalised legal relationship between belligerents. Under this classical framework, a state of war was exclusively established by a formal declaration of war or the expiry of a conditional ultimatum, and it could only be definitively terminated by the entry into force of a peace treaty.⁷ However, contemporary State practice and the evolution of international humanitarian law have significantly diminished the relevance of these formal prerequisites. Today, a formal declaration of war is no longer strictly necessary to trigger the application of the laws of armed conflict.⁸ Consequently, neutrality, as understood in its traditional sense, is a legal status arising automatically upon the factual outbreak of an international armed conflict, regardless of whether the belligerents have formally declared war. Just as this status arises automatically, it naturally concludes under two primary conditions: either with the overall termination of the international armed conflict; or by the neutral State crossing the threshold of participation and becoming a belligerent in that specific conflict.⁹

Once the conflict arises, neutrality faces a fundamental epistemological challenge: the absence of a universally accepted definition of what it means to be a 'neutral State'. Although the term appears in the conventions and is invoked in State practice, its meaning can only be inferred. It is commonly understood as referring to a State "not assisting or actively taking the side

⁴ BOTHE 2008: 571

⁵ International Criminal Tribunal for the Former Yugoslavia, *Prosecutor v. Tadić*, Case No. IT-94-1-AR72, 2 October 1995: "An armed conflict exists whenever there is a resort to armed force between states."

⁶ UPCHER 2020: 89.

⁷ "In fact, international law was premised on the dichotomy between law of peace and law of war, the latter brought about by the establishment of a formal state of war" (ANTONOPOULOS 2022: 17).

⁸ SEGER 2014: 248–249; BOTHE 2008: 571–582; UPCHER 2020: 46–54.

⁹ BOTHE 2008: 557–559; ANTONOPOULOS 2022: 22–23.

of either of two belligerent States or groups of States in a war; taking neither side nor view in a dispute, disagreement, or controversy”,¹⁰ a State abstaining from participation in the armed conflict.¹¹ Neutrals “do not take part in a war between other states”¹² and are described as “any state not party to the conflict”.¹³ Within this legal framework, the obligations of belligerents apply *ratione personae* to those States participating in hostilities, whether officially or *de facto*. Conversely, they also apply to neutral States, those abstaining from participation, who are themselves bound by specific duties under the law of neutrality.

The Hague Conventions V and XIII were soon tested by the First and Second World Wars, which revealed the fragility of neutrality law in the face of total war.¹⁴ The subsequent emergence of collective security further transformed the legal framework governing neutrality.¹⁵ The prohibition of the use of force under Article 2(4) of the UN Charter, in particular, considerably limited the range of countermeasures that belligerents or neutral States could lawfully adopt in response to alleged violations of neutral duties.¹⁶

As James Upcher has observed, neutrality “strikes many today as outmoded and obsolete, of a different era of international law: its rules the unstable product of compromise; in its essence incompatible, indeed utterly irreconcilable, with the prohibition on recourse to force and the development of collective security”.¹⁷ Nevertheless, both proponents of a more flexible, optional form of neutrality and those adhering to a traditional

¹⁰ VERZIJL 1979: 12.

¹¹ HEINTSCHEL VON HEINEGG 2017: 536. “Un État qui n’est pas partie à un conflit armé est un État neutre” (BETTATI 1994: 288).

¹² OPPENHEIM 1952: 316.

¹³ International Committee of the Red Cross 1995: Section V, definitions.

¹⁴ SCHINDLER 1991: 225.

¹⁵ SCHINDLER 1991: 225.

¹⁶ For a recent reasoning as to why the law of neutrality cannot justify the use of force, see INGBER 2025: 438–492. “Countermeasures shall not affect: (a) the obligation to refrain from the threat or use of force as embodied in the Charter of the United Nations” [International Law Commission 2001: Article 50(1)(a)].

¹⁷ UPCHER 2020: 1.

approach agree on one point: although modified, the law of neutrality has not disappeared.¹⁸

Neutrality functions as a subsidiary mechanism enabling States to abstain from participation in hostilities while maintaining relations, notably commercial relations, with the belligerents.¹⁹ Customary international law continues to uphold core principles of neutrality; abstention, impartiality and the inviolability of neutral territory.²⁰ In this respect, while it may no longer be the cornerstone of the international law of armed conflict, neutrality regains significance in contexts of increasing Security Council deadlock. Moreover, the Charter's prohibition of the threat or use of force has not brought an end to armed conflicts, and the law of neutrality remains relevant for regulating them and preventing neutral States from being inadvertently drawn into hostilities.²¹

At this stage, and to fully grasp the epistemological challenge, it is necessary to distinguish the specific legal framework of this study from related, yet distinct, concepts. This article focuses primarily on ordinary or belligerent neutrality; the *ad hoc* legal status that arises for a third State upon the outbreak of a specific international armed conflict, strictly governing its rights and duties vis-à-vis the active belligerents. This temporary wartime status differs fundamentally from permanent neutrality, a continuous legal regime established by treaty or domestic law obligating a State to remain neutral in all future conflicts and to eschew binding peacetime alliances, the State should remain neutral under all circumstances unless its neutral status is violated.²² Furthermore, it must be separated from non-alignment which characterises a State's peacetime refusal to join major geopolitical blocs. It must also be distinguished from non-belligerency, which is a term

¹⁸ For a panorama of the different views see ANTONOPOULOS 2022: 8–57; UPCHER 2020: 9–37; SCHMID 2024: 1044–1064.

¹⁹ NEFF 2022.

²⁰ ICJ 1996, *Advisory Opinion on the Threat or Use of Nuclear Weapons*, 89; also see UPCHER 2020: 70–124.

²¹ See HEINTSCHEL VON HEINEGG 2017: 528.

²² For an overview of the different conceptions of permanent neutrality see ANTONOPOULOS 2022: 12–13.

used when neutrality is considered optional as this stance allows States to not take part in an armed conflict but to favour a belligerent,²³ it is viewed as an intermediate status between neutrality and belligerency though it is not officially recognised in international law.²⁴ Clarifying these distinctions ensures that the application of neutrality law to the space domain is understood strictly through the lens of binding wartime legal obligations.

Another preliminary discussion indeed regards the character of neutrality. Neutrality, as understood in its traditional sense, is not an optional posture but a legal status arising automatically upon the outbreak of an international armed conflict.²⁵ However, recent scholarship has engaged in a profound debate on whether neutrality remains obligatory or has become optional under the UN Charter. Evelyne Schmid argues that neutrality is now 'optional but not qualified', allowing States to choose non-belligerency while preserving the integrity of neutrality for those who opt for it.²⁶ The classical view, on the other hand, does not overlook the erosion of compliance with neutral duties but considers the position of non-belligerency a form of non-compliance.²⁷

This article proceeds from the assumption that neutrality remains obligatory for States that are not parties to an armed conflict, unless and until collective measures are taken under Chapter VII of the UN Charter. This working assumption is adopted not to foreclose debate over neutrality's character, but because it offers the most analytically productive framework for examining space assets and the risks associated with them. If neutrality arises automatically, the scope of neutral obligations, particularly regarding dual-use satellites and private operators, becomes an immediate concern for all non-belligerent States, regardless of their declared position. This assumption thus enables the analysis to focus on the substantive question that matters most in the space domain: how to use neutrality to preserve space

²³ UPCHER 2020: 9–37; ANTONOPOULOS 2022: 13–16; BOTHE 2008: 571–582; SEGER 2014: 266.

²⁴ UPCHER 2020: 9–37; ANTONOPOULOS 2022: 13–16; BOTHE 2008: 571–582.

²⁵ UPCHER 2020: 38–40.

²⁶ For such a view see notably SCHMID 2024: 1044–1064.

²⁷ UPCHER 2020: 9–12.

security? Finally, State practice, though imperfect, has not yet established a clear customary norm displacing the traditional understanding;²⁸ the classical view thus remains the default framework from which deviations must be measured.

This analysis does not seek to resolve the broader debate on whether neutrality, in its entirety, has survived the UN Charter era nor to produce an in-depth study of the optional character – or not – of the law of neutrality. Instead, it proposes exploring the potential for neutrality law regarding satellite ground and space infrastructure in an armed conflict. Equally, this article does not seek to develop a fully detailed argument on applicability to the space domain, as it is, *per se*, a debated issue.²⁹

This study focuses primarily on neutrality as a framework for protection, explaining that the law of neutrality predates the United Nations Charter and may still serve as a subsidiary mechanism in moments of institutional paralysis when the Security Council is unable or unwilling to recognise a threat to the peace, a breach of the peace or an act of aggression. Yet, while the law of neutrality has traditionally protected and facilitated the commerce of neutral States, it was never conceived with the complexities of the contemporary space sector in mind. International humanitarian law has long addressed the dual-use nature of space assets, and neutrality law must now confront the same tension: could the protection of “neutral” satellites and infrastructures unintentionally pour fuel on the fire?

This article explores the dual role of the law of neutrality in outer space, asking whether it can protect neutral States and their space assets or, by inadvertence, escalate conflicts. While the first part examines neutrality’s historical evolution and its adaptation to airspace, cyberspace and potentially outer space, highlighting its protective function in shielding non-belligerents and stabilising international relations, the second part considers the risks posed by modern dual-use satellites and commercial

²⁸ UPCHER 2020: 9–12.

²⁹ “There is still no consensus with regard to the applicability of the neutrality law in space domain” (WANG–HU 2024: 5). See also HEINTSCHEL VON HEINEGG 2017: 532–536; WANG 2023.

actors, showing how indeterminacy and countermeasures could turn neutrality into a source of tension.

NEUTRALITY AS A SHIELD: PROTECTING STATES AND SPACE ASSETS

Neutrality was initially conceived as a shield, a shield that existed before the prohibition on the use of force and protected neutrals from the effects of war. This century-old framework has proven itself adaptable, extending from land and sea to airspace and, more recently, to cyberspace. As armed conflicts increasingly involve outer space, the question arises whether neutrality's protective logic might effectively limit the expansion of conflict and act as a safeguard.

The adaptive logic of infrastructure protection

The Hague Conventions of 1907 institutionalised the protective logic of the law of neutrality. Convention V, governing neutrality in land warfare and Convention XIII, addressing neutrality in naval warfare, both emphasised abstention from hostilities and the inviolability of neutral territory.

Though drafted in 1907, the Hague Convention V remarkably anticipated the challenges posed by communications in armed conflict. Article 3 prohibits belligerents from establishing new wireless telegraphy or other communication stations on the territory of a neutral State for the purpose of communicating with their forces on land or at sea and forbids the exclusive use of pre-existing installations for purely military purposes unless they are open to public correspondence.³⁰ Complementing this, Article 8 clarifies

³⁰ Hague Convention V, Article 3: "Belligerents are likewise forbidden to: (a) Erect on the territory of a neutral Power a wireless telegraphy station or other apparatus for the purpose of communicating with belligerent forces on land or sea; (b) Use any installation of this kind established by them before the war on the territory of a neutral Power for purely military purposes and which has not been opened for the service of public messages."

that neutral Powers are not required to restrict or forbid the use of telegraph or telephone lines, or wireless apparatus, belonging to the State, companies, or private individuals, by the belligerents.³¹

These provisions laid the foundation for customary international law governing the use of communications, a principle that has been echoed and elaborated in contemporary manuals on cyber and modern warfare. These provisions are relied upon for treaty interpretation and allow an evolutive interpretation. The terms employed by the drafters, such as “wireless apparatus” allow us to encompass modern technological equivalents, including satellite communication networks.

Articles 3 and 8 distinguish between purely military use, which is prohibited or restricted and civilian or public use, which may continue uninterrupted. Neutral communication infrastructures, therefore, were protected from interference by belligerents as long as their use did not amount to participation in hostilities or provide exclusive assistance to one side. Neutrality is thus not merely a duty of abstention; it is a law of protection. It shields neutral infrastructure from hostile interference and creates expectations of continuity in trade, communications and essential services.

Neutrality’s origins are a shield of protection and a mechanism of de-escalation. As Lassa Oppenheim observed, neutrality is the legal condition through which non-belligerents preserve their rights and duties vis-à-vis belligerents, including the protection of their assets from the effects of war.³² The neutral State seeks to protect its territory, population and economy from the consequences of armed conflict, and neutrality has long served as a deliberate strategy for militarily weaker powers.³³ It provides a framework that prevents neutrals from being unintentionally drawn into the conflict.³⁴ Beyond its protective function, neutrality has always played a stabilising role.

³¹ Hague Convention V, Article 8: “A neutral Power is not called upon to forbid or restrict the use on behalf of the belligerents of telegraph or telephone cables or of wireless telegraphy apparatus belonging to it or to companies or private individuals.”

³² OPPENHEIM 1952: 318.

³³ BOYE 1938: 213.

³⁴ ANTONOPOULOS 2022: 8–57.

As noted by Paul Seger, “they contribute to international predictability and stability”.³⁵ This teleological approach to the law of neutrality also supports its extension to the protection of modern telecommunication infrastructures.

The protective function of neutrality extends beyond infrastructural safeguards to encompass diplomatic and humanitarian dimensions. Neutral States may continue to play their traditional role as mediators in new areas of conflict such as cyberspace and outer space. Though outer space constitutes a new area of conflict, they could still play that role, contributing to international peace and security. The United Nations General Assembly expressly recognised this mediating vocation in its resolution of 2 February 2019 which underlined “that the national policies of neutrality of some States can contribute to the strengthening of international peace and security in relevant regions and at the global level and can play an important role in developing peaceful, friendly and mutually beneficial relations between the countries of the world” and are “aimed at promoting the use of preventive diplomacy”.³⁶ The space domain was not envisioned in 1907, but the rationale of neutrality, as a means of containing conflicts and as a means for States to be mediators, remains.

Neutrality's adaptability to new domains of warfare

Initially, in light of armed conflict on land and at sea and the use of telegraphic and radiotelegraphic lines, neutrality is a framework constantly renewed by new technologies and methods of warfare.³⁷ Neutrality adapts as new domains of conflict emerge. In maritime law, neutrality shielded merchant ships and neutral ports. In the early twentieth century, the advent of aviation required transposing neutrality principles to the skies; the Hague Conventions of 1907 did not yet foresee aircraft, but subsequent State practice and

³⁵ SEGER 2014: 269.

³⁶ United Nations General Assembly 2017: Resolution 71/275.

³⁷ For the application to cyberspace and space domains specifically see DINSTEIN–DAHL 2020; SCHMITT 2017; BEARD–STEPHENS 2024.

doctrine extended neutrality protections to neutral airspace.³⁸ Finally, the International Court of Justice, in its advisory opinion of 1996 on the threat and use of nuclear weapons, considered the “principle of neutrality, whatever its content, [...] is applicable to all international armed conflict, whatever type of weapons might be used”.³⁹ This recognition, though non-binding, reaffirms neutrality’s enduring adaptability and its capacity to serve its protective purpose under changing technological means.

Whether some of its principles extend to space-based segments of satellite systems remains a subject of debate today.⁴⁰ However, building on the commentaries to the 1907 Hague Convention V, which addressed radiotelegraphy with notable openness towards future forms of telecommunication, together with more recent interpretations and customary international law, one may reasonably conclude that the law of neutrality applies to ground stations located on the territory of neutral States.⁴¹ Modern telecommunication architecture dictates that these systems are never one-sided; they rely on an inseparable continuum of infrastructure. Therefore, one must conclude either that satellites are directly encompassed by the Hague Conventions due to the treaties’ openness to new methods of communication (with the satellite network constituting a modern wireless apparatus), or that the customary principles of neutrality, as affirmed by the 1996 ICJ advisory opinion, inherently extend beyond terrestrial infrastructure to cover the entirety of a satellite system. Consequently, the rights and duties of neutral States should be understood to comprehensively cover both the ground and the space segment. Such an approach has been followed by manuals such as the Tallinn and Oslo Manuals that have elaborated neutrality obligations in cyberspace and even Outer Space.⁴²

As reflected in the French and Swiss commentaries on neutrality, belligerents are required to integrate the foreseeable consequences of their operations on neutral infrastructures into their military assessments. The

³⁸ WILKE–DOUTAGHI 2024.

³⁹ ICJ 1996, *Advisory Opinion on the Threat or Use of Nuclear Weapons*, 89.

⁴⁰ WANG–HU 2024: 5.

⁴¹ SCHMITT 2017: 558.

⁴² See SCHMITT 2017: 558; see DINSTEIN–DAHL 2020.

conduct of hostilities is constrained by the protective regime surrounding neutral infrastructure, creating an additional dynamic of precaution that compels belligerents to evaluate and integrate, into their operational assessments, the foreseeable consequences of an attack on neutrals. The French doctrine explicitly provides that “belligerents must refrain from causing harmful effects on digital infrastructures located in the territory of a neutral State, or from launching a cyberattack from those infrastructures”.⁴³ Similarly, the Swiss position states that “belligerent States are not permitted to damage the data networks of neutral countries when undertaking combat operations via their own computer networks”.⁴⁴ Though these modern restatements concern cyberspace rather than specifically Outer Space, they embody a transposable rationale: the duty of restraint towards neutral infrastructure.

The same logic and the same opportunities apply to the space domain. The law of neutrality could equally be envisaged under the due regard principle. Indeed, under Article IX of the Outer Space Treaty, all space activities must be conducted “with due regard to the corresponding interests of all other States Parties”.⁴⁵ Though the ‘corresponding interests’ of other States are left undefined, the concept of an interest is broad and inherently encompasses legally established rights as a subset.⁴⁶

In this context, while a State’s general political posture of remaining outside a conflict might exceed the strictly space-related scope of Article IX, its specific interest in pursuing lawful space operations in an undisturbed manner certainly falls within this provision. By upholding the neutral duties of abstention and prevention in their space affairs, non-belligerents actively

⁴³ “Les belligérants doivent s’abstenir de provoquer des effets dommageables sur les infrastructures numériques situées sur le territoire d’un État neutre ou de lancer une cyberattaque depuis ces infrastructures” (French Ministry of the Armed Forces 2019: 17).

⁴⁴ Cooperative Cyber Defence Centre of Excellence 2021.

⁴⁵ Outer Space Treaty 1967: Article IX.

⁴⁶ The due regard principle obligates States to take the rights of other States into account when exercising their own freedoms. In international law, the obligation to pay “due regard” to the interests of other States, a principle directly inherited from the Law of the Sea, is universally understood to encompass the obligation to respect their established legal rights (AZCÁRATE ORTEGA – SAMSON 2023: 31).

preserve this operational interest. Consequently, the due regard principle serves to protect the legally established right of a neutral State to preserve the inviolability of its space assets.

This rule is reflected in the Oslo Manual, stating that “as a general principle, Belligerent States must conduct their Outer Space operations with due regard for the rights of Neutral States” to “reduce the risk of damaging neutral critical infrastructure and communication space assets”.⁴⁷

The law of neutrality, in this sense, functions as a default regulation.⁴⁸ Even in the absence of a comprehensive legal regime addressing the challenges posed by the dual-use nature of space assets, it provides a normative framework capable of limiting the expansion of armed conflict, stabilising international relations, and safeguarding both space-based infrastructure and its terrestrial ground stations.

NEUTRALITY’S PARADOX: LEGAL AMBIGUITIES AS A RISK TO WIDENING THE CONFLICT

If neutrality was born as a shield, it also reveals a paradox: violations of neutral obligations can entitle the injured party to take countermeasures. Though under the United Nations Charter, forcible countermeasures are prohibited, the ambiguity of what constitutes a “use of force” remains for non-kinetic space operations. States may dispute both whether a violation of the law of neutrality has occurred and whether a given countermeasure crosses the threshold from permissible (non-forcible) to prohibited (forcible).

⁴⁷ DINSTEIN-DAHL 2020: 15.

⁴⁸ “Given the improbability of the development of an effective legal regime to resolve conflicting national priorities concerning the weaponization of space, the law of neutrality remains, if only by default, a primary normative structure in the regulation of the practical effects of space control” (BOURBONNIÈRE 2006: 326).

The sources of indeterminacy

The greatest threat to the potential of neutrality law in space lies in indeterminacy. The subject of this indeterminacy encompasses two legal thresholds: first, the boundary between lawful commercial space activities and unlawful indirect participation in an armed conflict; and second, the precise assessment of what constitutes a prohibited use of force regarding non-kinetic space operations, such as spoofing or jamming. The nature of this indeterminacy is rooted in the inherent dual-use capacity of satellite infrastructure. This technological reality creates a structural clash between classical neutrality law which generally exempts private commercial civil trade from State attribution and the strict State responsibility regime established by Article VI of the Outer Space Treaty.

Already evident in the classical debates over the optional character of neutrality and its coexistence with the UN Charter, these indeterminacies become acute when transposed to space-based telecommunications. The question is no longer whether neutrality applies in space, but rather whether its undefined contours could themselves endanger space security, as the 'red lines' remain undetermined and require clarification.

This is true for space as it was, back in 1856, for the seas. As the Paris Declaration observed in the maritime context, "the uncertainty of the law and of the duties in such a matter, gives rise to differences of opinion between neutrals and belligerents which may occasion serious difficulties and even conflicts".⁴⁹ Just as the maritime powers of the nineteenth century sought to codify neutrality to prevent discord, so too is it now desirable to clearly define the rights and duties of neutral States in outer space.

This indeterminacy has already manifested in contemporary discourse. In successive interventions before the United Nations Security Council, Russia has invoked the Hague Conventions of 1907 to accuse Western States of

⁴⁹ Declaration Respecting Maritime Law, Paris, 16 April 1856, Point 3.

violating neutrality law through their assistance to Ukraine.⁵⁰ In November 2023, Russia reiterated before the Security Council that

Western countries are assiduously asserting that they are not involved in this conflict. [...] International law, including the provisions of the Hague Conventions and the norms of customary international law, are unequivocal: the commission of such acts means that these States must lose their neutral status and will become parties to an armed conflict.⁵¹

Though not concerning satellite imagery or telecommunications provided to Ukraine, the Russian rationale could soon expand to include outer space. This rhetoric illustrates a growing lawfare strategy using the law of neutrality as a legal basis,⁵² the absence of clear definitions regarding satellite assistance creates opportunities to justify countermeasures or escalation in the space domain.

What these modern statements emphasise as well is a blurred line between a violation of neutrality law and participation in the conflict. It is of the utmost importance today to recall the distinction between the two notions, especially in the space domain. Active participation in, or a sufficiently grave violation of, the law of neutrality could indeed amount to belligerency; however, minor violations do not reach that threshold.

Furthermore, the legal issue regarding the use of commercial satellites in armed conflicts vis-à-vis the law of neutrality rests in the complex articulation between the traditional commercial exemptions established in the Hague Conventions and the strict responsibility regime of the *corpus juris spatialis*. Under Article 7 of Hague Conventions V and XIII, a neutral power is not required to prevent its private nationals from exporting or transporting war material to a belligerent, establishing a protective distinction between State conduct and private commerce, as the commercial activities of private

⁵⁰ “Western countries insist that they are not parties to the conflict but are only helping Ukraine to defend itself. However, the reality is the polar opposite” (United Nations Security Council 2023a).

⁵¹ United Nations Security Council 2023b.

⁵² ANTONOPOULOS 2023.

companies cannot, in general and unless attributed, trigger the State's responsibility.⁵³ However, this distinction is challenged by Article VI of the Outer Space Treaty, which stipulates that States Parties bear international responsibility for national activities in outer space regardless of whether they are carried out by governmental agencies or non-governmental entities. This provision creates the potential for automatic attribution, raising the question of whether the state's obligation to authorise and supervise these activities effectively 'attracts' private commercial conduct into the realm of State responsibility.⁵⁴

This distinction is highly important because the law of neutrality's historical concessions for private commerce was not originally intended to permit the State itself to enter the arms trade. While Articles 7 of both Hague Conventions V and XIII accommodates the commercial interests of private actors, the direct or indirect supply of war material by the State itself is explicitly forbidden under Article 6 of Hague Convention XIII.⁵⁵

The core issue, therefore, arises from the complex intersection of three factors: the attribution mechanism of Article VI of the Outer Space Treaty; the strict prohibition on the State supply of war material under Article 6 of Hague Convention XIII (particularly if recognised as a customary rule); and the undefined threshold of what constitutes 'war material' in the space domain. If modern dual-use space services, such as navigation, imagery, or telecommunications, are classified as war material because they are used to guide missiles, pilot drones, or gather intelligence on behalf of a belligerent, their automatic attribution to a neutral State could, under a broad interpretation of neutrality law, be construed as a violation of the duty of abstention. Yet, fundamentally, these remain private commercial activities, and States could even lawfully pursue their trade with belligerents if they are not to be considered war material. A legal framework in which a State bears

⁵³ Hague Convention V, Article 7; Hague Convention XIII, Article 7.

⁵⁴ See notably WANG-HU 2024.

⁵⁵ "The supply, in any manner, directly or indirectly, by a neutral Power to a belligerent Power, of war-ships, ammunition, or war material of any kind whatever, is forbidden" (Hague Convention XIII, Article 6).

strict international responsibility for the operational activities of a private company was also unforeseen by the drafters of the 1907 Conventions.

Finally, compounding these challenges is the practical difficulty of assessing to which specific State a commercial space activity should be attributed in the first place. Indeed, especially in the event of a non-registered satellite,

there lacks comprehensive discourse among states concerning the attribution standard of private/commercial space activities [...]. On the one hand, the *lex lata* does not provide explicit guidelines on the allocation and attribution about commercial space involvement in armed conflicts [...], in other words, it does not address the required legal nexus which might include (but is not limited to) the nationality link between a state and the corresponding non-governmental entity or the space activities carried on by it.⁵⁶

These layers of indeterminacy create an environment prone to unilateral State interpretation. Without clear rules, belligerents can exploit these grey zones to justify unilateral countermeasures against neutral space infrastructure.

*From indeterminacy to potential
countermeasures on space infrastructure*

This rhetorical strategy, based on the grey zones of the law of neutrality, gains additional potency in the space domain due to the inherent dual-use character of space-based infrastructure, which blurs the line between lawful commerce and unlawful assistance by a State to a belligerent. We now live in an era where satellites serve as the eyes and ears of the battlefield. Where armed conflicts may begin with massive cyberattacks against the network of a foreign actor as illustrated by the attack on Viasat on 24 February 2022. Where space assets belonging to or registered in neutral States are used to collect intelligence, provide imagery, guide missiles, or sustain

⁵⁶ WANG-HU 2024: 5.

military communications. These are forms of warfare entirely unforeseen by the drafters of the 1907 Hague Conventions. Commercial operators such as Maxar Technologies, Iceye, Starlink and OneWeb have played a decisive role in supporting Ukraine's war effort.⁵⁷ The French National Assembly's Information Report n° 1425 of 15 May 2025 on satellites with military applications rightfully observes that "the Russo–Ukrainian conflict has brought the use of space capabilities to a paroxysm", noting that "both parties to the conflict make extensive use of satellite observation and image exploitation".⁵⁸

The dual-use nature of space assets means that the same satellite constellation can transmit civilian broadband while simultaneously supporting military communications, targeting and reconnaissance. When private operators provide services that materially assist one party in an armed conflict, the neutral State, if considered the appropriate State under Article VI of the Outer Space Treaty, faces potential attribution.

Beyond the question of legitimate targeting under international humanitarian law, such conduct risks being considered indirect participation in hostilities and could breach neutrality obligations. As James Upcher explains, there is "a considerable grey zone of activity that covers both a neutral's acquiescence in belligerent activity on neutral territory that the neutral State is powerless to prevent, as well as various forms of 'aid and assistance' rendered as an unneutral service".⁵⁹ By analogy, satellite communications or intelligence provided to a belligerent in times of war, if partially executed and not envisaged under the exceptions of the Hague Conventions, could constitute such an indirect participation in the armed conflict.

China raised this dilemma explicitly before the Open-Ended Working Group on Reducing Space Threats in 2022. Its working paper warned that "some commercial space companies interfere in armed conflicts directly, causing international concern as well as legal controversy"⁶⁰ and urged States to "ensure that these activities are carried out in conformity with

⁵⁷ NASU 2022; see also GURANTZ 2024.

⁵⁸ French National Assembly 2025: 44.

⁵⁹ UPCHER 2020: 58.

⁶⁰ United Nations 2023.

the Outer Space Treaty” and to “make an in-depth study of the political and legal consequences of commercial space companies’ involvement in military activities in outer space and interference in armed conflicts and prevent commercial space companies from taking a dangerous path”.⁶¹

When a neutral State fails to uphold its obligations, for instance due to attributable commercial space activities, an aggrieved belligerent has several recourses. First, it may seek diplomatic or institutional remedies, such as bringing the issue before the United Nations Security Council. Second, it may resort to non-forcible belligerent countermeasures to induce compliance.⁶² These countermeasures must be strictly distinguished from a formal expansion of the conflict: in that case, the countermeasures only aim at stopping the violation of the law of neutrality. The issue at stake at present is that in the absence of a more precise definition of what constitutes a violation of neutral obligations, States may unilaterally interpret these rules.

These non-forcible countermeasures also face another problem: differing interpretations of what constitutes a use of force in space (direct kinetic attacks are easier to assess than spoofing or jamming). This creates a dangerous dual indeterminacy: not only is it unclear when a neutral State’s conduct constitutes a violation warranting countermeasures, but it is also unclear whether a given countermeasure (jamming satellite signals, spoofing, or broader interference) itself crosses the threshold into prohibited use of force.⁶³ In outer space, where infrastructure is inherently transnational and dual-use, the threshold for escalation is dangerously low; breaches of neutrality can set off a spiral of escalation, where one violation triggers countermeasures, which in turn expand hostilities.⁶⁴ The Oslo Manual on Select Topics of the Law of Armed Conflict attempts to address the first

⁶¹ United Nations 2023.

⁶² ICJ, 1986, *Military and Paramilitary Activities in and against Nicaragua*, 249; ICJ, 1997, *Gabčíkovo–Nagymaros Project* (Hungary–Slovakia), 83–87; ILC, 2001, *Articles on Responsibility of States for Internationally Wrongful Acts*, Articles 49–54; see also SCHMITT 2017: 559.

⁶³ See POBJIE – AZCÁRATE ORTEGA 2024; BEARD–STEPHENS 2024: 201–221; CYMUTTA 2022.

⁶⁴ ILC, 2001, *Articles on Responsibility of States for Internationally Wrongful Acts*, Articles 49–54; see SCHMITT 2017: 559.

gap through Rule 18, which states: “As a general principle, neutral States must not knowingly allow space systems and assets for which they are responsible to be used by belligerent States in outer space operations related to armed conflict.”⁶⁵ This provision, though non-binding and not shared by the Tallinn Manual 2.0, presents a broad interpretation of the principle of impartiality extended to space by analogy. Yet, it also recognises that “commercial and trade activities by neutral companies or individuals with a belligerent State are not prohibited”.⁶⁶

This ambiguity echoes the broader challenge: determining when ordinary commercial activity becomes unlawful assistance. The rule’s formulation, “space systems for which they are responsible”, raises additional uncertainty about the degree of control, supervision, or jurisdiction that triggers State responsibility under Article VI of the Outer Space Treaty, a point that recalls the aforementioned Chinese rationale.

Indeed, as States bear international responsibility for national activities in outer space, this ambiguity becomes especially problematic where such activities may put at risk, or even breach, a neutral State’s obligations under the law of neutrality. If commercial services are deemed to cross the threshold of war material, the automatic responsibility imposed by the Outer Space Treaty could lead opposing belligerents to attribute these private acts to the State itself. Consequently, the State’s failure to prevent such assistance, even if purely commercial in origin, could be construed as a violation of the duties of abstention and prevention.

No countermeasure has ever been taken explicitly in accordance with the neutrality law in outer space. Yet, reliance on prudence or restraint alone is insufficient. If the law’s scope remains undefined, the deterrent value of neutrality evaporates. Either a clarified due diligence regime for neutrals or preventive measures is necessary. The ICRC proposed such precautions in its preliminary recommendations on possible norms, rules and principles of responsible behaviours relating to threats by States to space systems, emphasising:

⁶⁵ DINSTEIN–DAHL 2020: 15.

⁶⁶ DINSTEIN–DAHL 2020: 16.

To segregate, to the extent feasible, space systems used for military purposes from space systems used for civilian purposes, including satellites, ground stations and communication links [...]. To this end, whenever feasible, States and commercial enterprises developing or operating space systems should work to develop and use dedicated space products and infrastructure such as satellite payloads, ground terminals, cyber infrastructure and networks and communication links, either for exclusively military purposes or for exclusively civilian purposes [...]. Finally, States should exercise their supervisory and regulatory role to require commercial satellite companies that provide such services to do so.⁶⁷

This approach could address many of the difficulties arising under both international humanitarian law and, more specifically, the law of neutrality. For the time being, it may well represent the most effective means for a neutral State to demonstrate genuine abstention and thereby preserve its neutral status. Yet, this solution remains deeply at odds with the current structure of the space economy, in which commercial viability often depends on defence contracts and dual-use technologies. The ideal of strict separation seems economically and politically distant from present realities.

Finally, a third, more radical option exists: the aggrieved belligerent might unilaterally declare the ex-neutral State a belligerent and attack its space assets as legitimate military objectives. However, this extreme escalation is heavily constrained by international law. A neutral State does not automatically become a party to the conflict simply by committing an isolated or minor violation of neutrality law.⁶⁸ As mentioned earlier, the indeterminacy of the content of the law of neutrality and of the threshold of a use of force for non-kinetic operation is sometimes blurred. Nevertheless,

⁶⁷ International Committee of the Red Cross 2023.

⁶⁸ "What this practice appears to demonstrate is that even massive financial and logistical support, and repeated violations of the law of neutrality, does not amount to co-belligerency or 'participation' in the hostilities. This approach seems to be confirmed in recent case law, which has rejected the view that the granting of logistical facilities, in violation of the neutral duty of prevention, amounts to participation in hostilities" (UPCHER 2020: 54–86).

to be considered a belligerent, the actions of the ex-neutral State must constitute either grave and repeated violations of the law of neutrality or cross the threshold of a prohibited use of force. If the aggrieved belligerent attacks the neutral's space assets without this high threshold being met, the attack cannot be justified as a legitimate response; rather, it constitutes an unlawful act of aggression. In such an event, the neutral State retains its inherent right of self-defence to repel the attack and may theoretically resume its neutral status once the immediate threat is neutralised and the matter settled. There is indeed "a fundamental difference between a valid repulsion of belligerent attempts to violate neutrality, and 'hostilities' against the neutral which create a state of war between the belligerent and the neutral".⁶⁹

In such a context, the absence of a clarified framework amplifies risks. In a domain where infrastructures could involve different countries, where the consequences of a hostile act can have consequences for various States, even a single misinterpreted act could entangle multiple States in hostilities.

CONCLUSION

Satellites will likely never cease to be used in armed conflict, and though neutrality is an evolving stance, many states will want to remain outside of these conflicts. Neutrality must, however, remain a shield that enables, as it has for centuries, neutrals to preserve their assets. The same logic and the same opportunities apply to the space domain. The law of neutrality could serve to limit the expansion of armed conflict beyond Earth, stabilise international relations and protect both space assets and their terrestrial ground stations from hostile interference. If extended prudently to outer space, neutrality would not be an anachronism but a natural evolution of its protective function, a framework through which the preservation of peace, the continuity of civilian infrastructures and the predictability of international conduct could be maintained even in the most modern theatres of war.

⁶⁹ UPCHER 2020: 63.

Neutrality is a tool for space security; however, it can “only be enhanced by the determination of clear norms helping belligerents identify neutral space assets and determining the corresponding rights and duties of neutral States”.⁷⁰ This paradox brings us full circle. The very system designed to shield non-belligerents from war may, through uncertainty, become a vector of escalation.

The solution is neither to abandon neutrality in outer space nor to apply nineteenth-century rules without adaptation. Instead, the international community must undertake what the 1856 Paris Declaration deemed necessary for maritime warfare and what remains equally urgent for space security: the clarification and codification of neutral obligations in a context of technological complexity and dual-use infrastructure.

Two points deserve emphasis: first, that countermeasures based on the law of neutrality no longer justify any use of force; and second, that the law of neutrality can and should be a shield for space security. But shields require a clear definition. Without it, the very framework designed to contain conflict risks becomes an instrument of its expansion. The relevance of neutrality in outer space ultimately depends on the international community’s willingness to replace indeterminacy with clarity and uncertainty with predictability. Only then can neutrality serve its centuries-old purpose: preserving peace through law and protecting those who stand apart.

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⁷⁰ BOURBONNIÈRE 2006: 336.

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Barbara Horváth

THE PRINCIPLES OF DUE REGARD
AND HARMFUL INTERFERENCE
IN ARMED CONFLICT

INTRODUCTION

Nowadays, space technologies play a particularly important role in our lives. They support telecommunications, navigation and Earth observation (EO) and provide essential services – such as global internet connectivity – without which our current society would be unimaginable. The so-called ‘New Space Age’ has brought rapid technological progress, making outer space more accessible and affordable. However, we cannot forget that these achievements are accompanied by significant challenges. The commercialisation of outer space has led to increasingly congested orbits and irresponsible activities that jeopardise the long-term safety, security and sustainability of the outer space environment.

From the beginning of the space age, the military and security implications of space activities have been a key consideration. Although the formation of international space law was guided by the purpose of preserving outer space as a peaceful and safe domain, recent developments and ongoing conflicts – most notably the Russian–Ukrainian conflict – have blurred the boundary between peaceful and military uses of outer space. For the first time in history, both parties to an armed conflict have extensively used space-based capabilities and satellites have become fully integrated into conventional warfare, enhancing battlefield awareness, precision targeting, communication and co-ordination between units. This conflict, therefore, illustrates how space technologies, including commercial satellite systems, have fundamentally transformed modern military operations.

Based on the above, the use of satellites in warfare is no longer limited to the traditional space powers – the United States and Russia – China and

India have also developed sophisticated space capabilities.¹ Anti-satellite (ASAT) weapons – tested also by these nations – highlight the potential destructiveness of space-based military technologies. Besides kinetic ASAT systems, States also possess non-destructive means of interference, including electronic jamming, cyber operations and laser systems, designed to temporarily or permanently disable satellites. These developments mark a shift in the militarisation of outer space, which increasingly encompasses cyber and electronic domains rather than purely physical confrontation.

From a legal perspective, these developments pose significant gaps and ambiguities in the current international legal framework. The Outer Space Treaty does not contain many specific provisions regarding military activities in outer space. As space law is not a self-contained regime, we can also suggest that the principles of law of war (*jus ad bellum* and *jus in bello*) also apply.² Furthermore, there are also provisions in international environmental law that may be of relevance. Therefore, the existing legal system is fragmented and struggles to address the realities of modern military space operations.

Article IX of the Outer Space Treaty establishes the fundamental principles for space activities, including co-operation, mutual assistance, the prohibition of harmful interference and non-contamination. The second part of the article provides a detailed overview of the consultation mechanism in place in the event of harmful interference. The due regard principle and the consultation mechanism both play a particularly important role in the event of an armed conflict. However, as their content remains undefined, it is not entirely clear how they interact with other rules and principles of the law of war, especially international humanitarian law (IHL, *jus in bello* or LOAC, law of armed conflict).

In light of these points, the primary objective of this study is to analyse the interaction between the principles of due regard and the prohibition of harmful interference and the consultation mechanism outlined in Article IX of the Outer Space Treaty, with humanitarian law norms in the context of an armed conflict. The study, therefore, examines the definitions of the due regard principle and harmful interference and investigates their

¹ O'MEARA 2024.

² BARTÓKI-GÖNCZY – SÜLYÖK 2022: 81.

relationship. Additionally, it examines the relationship between international humanitarian law principles – military necessity, distinction, proportionality and humanity – and the due regard and harmful interference principles.

THE RELATIONSHIP BETWEEN INTERNATIONAL SPACE LAW AND INTERNATIONAL HUMANITARIAN LAW

Before examining the relationship between the principles of due regard and harmful interference and the rules of international humanitarian law (IHL), it is first necessary to determine whether these principles remain applicable in case of an armed conflict. Guidance is provided by Article 3 of the International Law Commission's Draft Articles on the Effects of Armed Conflicts on Treaties (2011),³ which states that "[t]he existence of an armed conflict does not *ipso facto* terminate or suspend the operation of treaties: (a) as between States parties to the conflict; (b) as between a State party to the conflict and a State that is not".⁴ This provision affirms the principle of legal continuity and stability in treaty relations during armed conflict,⁵ and confirms that the outbreak of an armed conflict does not automatically extinguish treaty obligations. Of course, exceptions may arise where a treaty itself contains specific provisions governing its operation in situations of armed conflict.⁶ In such cases, those *lex specialis* clauses must be applied. Additionally, suspension, termination or withdrawal may be possible under certain circumstances. However, these are not automatic and require a case-by-case assessment of several factors, including the nature of the treaty, its objective, purpose, content and the characteristics of the armed conflict.⁷ In addition, a State intending to suspend or terminate a treaty must notify the other parties or the depositary in accordance with the applicable

³ International Law Commission 2011: 183–185.

⁴ ILC Draft Articles on Armed Conflicts, Article 3.

⁵ ILC Draft Articles on Armed Conflicts Commentary, 111.

⁶ ILC Draft Articles on Armed Conflicts, Article 4.

⁷ ILC Draft Articles on Armed Conflicts, Article 6.

rules.⁸ The Outer Space Treaty does not contain provisions addressing its applicability in situations of armed conflict, nor does it indicate that its operation would be suspended or terminated under such circumstances. On the contrary, its core objectives – namely, the peaceful use of outer space and the maintenance of safety and security in space activities⁹ – are not inherently neutralised by the existence of armed conflict. It follows that the principles of due regard and harmful interference may continue to apply during armed conflict and may retain significant normative relevance.

Additional guidance is found in Section 3 of the Vienna Convention on the Law of Treaties, which sets out the recognised grounds for termination, withdrawal or suspension of treaties. These include termination or withdrawal in conformity with the treaty's provisions, consent of all parties after consultation, material breach, supervening impossibility of performance, fundamental change of circumstances, severance of diplomatic or consular relations and the emergence of a new peremptory norm of general international law (*jus cogens*).¹⁰ While certain of these grounds may, in principle, become relevant in the context of hostilities, the Convention makes clear that armed conflict as such does not automatically result in suspension or termination.

Finally, there is no *a priori* hierarchical relationship between international space law and international humanitarian law.¹¹ Rather, these two bodies operate in a complementary way. Article III of the Outer Space Treaty explicitly links space activities to general international law by requiring that they be conducted “in accordance with international law, including the Charter of the United Nations”. This formulation confirms that both *jus ad bellum* and *jus in bello* apply to activities in outer space. Accordingly, the continued applicability of the Outer Space Treaty during armed conflict is not displaced by IHL. Instead, the relevant principles of space law and IHL must be interpreted and applied in a coherent and complementary way.

⁸ ILC Draft Articles on Armed Conflicts, Article 6.

⁹ Outer Space Treaty, Preamble.

¹⁰ VCLT 1969, Section 3.

¹¹ HANSEN 2015: 53.

THE NORMATIVE FRAMEWORK OF ARTICLE
IX OF THE OUTER SPACE TREATY

Interpreting the due regard principle

The principle of ‘due regard’ occupies a central, yet often underexamined, place within the legal framework governing the use and exploration of outer space. The legal roots of the principle extend beyond outer space law. It reflects a broader pattern in international law. The term was first drafted in the Chicago Convention, which requires aircraft to fly with due regard for the safety of civil aviation and seeks to ensure the safety of civil aviation.¹² Since then, the principle has also appeared in the 1982 UN Convention on the Law of the Sea (UNCLOS). In the context of space law, the principle of ‘due regard’ was first drafted by the UN COPUOS in 1963, in General Assembly Resolution 1962 (XVIII), which addressed the basic legal principles governing the activities of States in the exploration and use of outer space.¹³ Later, it was reaffirmed in the Outer Space Treaty as one of the most fundamental principles of international space law, as a compromise between the USA and the USSR.¹⁴ In recent years, the proliferation of small satellites, the increase in the amount of space debris in Earth orbits, space resource utilisation and other emerging issues have highlighted the importance of the due regard principle. However, due to the escalation of conflicts worldwide in recent years, the application of the principle in armed conflicts has also come into focus. Despite this important role, there is still no generally accepted definition of the due regard principle, and several ambiguities remain regarding the meanings of ‘due’ and ‘corresponding interests’.

According to Article IX of the Outer Space Treaty,

[i]n the exploration and use of outer space, including the Moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle

¹² Chicago Convention, Article 3 (d).

¹³ United Nations General Assembly 1963: Principle 6.

¹⁴ HOBE et al. 2017: 583.

of co-operation and mutual assistance and shall conduct all their activities in outer space, including the moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty.¹⁵

The Outer Space Treaty does not provide a precise definition of ‘due regard’ or ‘corresponding interests’. However, this also can reflect an intentional flexibility that allows adaptation to evolving technological and political contexts. The terms must also be interpreted in accordance with the 1969 Vienna Convention on the Law of Treaties (VCLT), which declares in Article 31 that “[a] treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose”.¹⁶ Consequently, the due regard principle functions as a ‘relational norm’ rather than a fixed rule, it is less about prescribing specific conduct and more about ensuring that interactions among spacefaring entities remain co-operative, transparent and non-harmful.¹⁷ On this basis, Article IX and the due regard principle basically serve as a limitation to the freedom of exploration, use and scientific investigation of outer space.¹⁸

The primary objective of the principle is to ensure that States avoid hampering the space activities of other States. Furthermore, it requires States to maintain a certain standard of care, attention and observance when conducting space activities.¹⁹ Based on this requirement, States must prove that they took every reasonable measure to prevent harm to other States’ activities or to the outer space environment. This, however, must be interpreted on a case-by-case basis.²⁰ However, it is important to note that this does not give a State the freedom to act in a manner that disregards the interests of the other State. Instead, the application of due regard is contingent on the nature and characteristics of the rights and duties involved.

¹⁵ Outer Space Treaty, Article IX.

¹⁶ VCLT 1969, Article 31.

¹⁷ JAROSE 2023.

¹⁸ Outer Space Treaty, Article I.

¹⁹ HOBE et al. 2017: 593.

²⁰ HARRINGTON 2023: 66–68.

The precise obligations required by the due regard principle can therefore be determined by the extent of the anticipated infringement of interests.²¹

The concept of ‘corresponding interests’ highlights that there are more interests in outer space, and States cannot follow a unilateral or discriminatory approach. Therefore, when conducting Space activities, States should also take into account the interests of other States.²² However, it should be noted that there is no universally accepted definition of what can be considered ‘corresponding interests’. Based on the Cambridge Dictionary, interest in the law context can be defined as ‘an involvement or a legal right’.²³ Additionally, in this context, ‘interests’ can be interpreted in two dimensions. Firstly, it can be understood to refer to the interests between spacefaring States. Secondly, it can be interpreted as the interests of a spacefaring nation and the wider international community.²⁴ The Permanent Court of Arbitration also defined it as a call on the State to have regard for the interests of another State as is required by the circumstances and by the nature of the given rights.²⁵ Interpreting ‘corresponding interests’ therefore requires situating them within the broader objectives of the Outer Space Treaty, such as the peaceful use of outer space, international co-operation and the prohibition of harmful interference. Furthermore, it is imperative to assess each case individually to determine what constitutes a relevant interest in the context. This can include financial, economic, safety, environmental, etc., interests of space actors.

Due regard is, of course, also linked to other obligations. First, it necessarily includes consultations in good faith²⁶ and requires that States undertake all appropriate measures to avoid harm to other States. As a duty of conduct,

²¹ HARRINGTON 2023: 66–68.

²² HOBE et al. 2017: 566–571.

²³ Cambridge Dictionary s. a.

²⁴ United Nations 2022.

²⁵ Chagos Marine Protected Area Arbitration (Mauritius v. United Kingdom), Award, 18 March 2015, PCA Case No. 2011-03, Permanent Court of Arbitration. Original: “[...] the ordinary meaning of ‘due regard’ calls for the [State] to have such regard for the rights of [another State] as is called for by the circumstances and by the nature of those rights. The Tribunal declines to find in this formulation any universal rule of conduct.”

²⁶ HARRINGTON 2023: 70–71.

due regard entails a balance of rights and interests and obligates States to seek compromise and to consider the interests of other actors. Second, it is also important to note that the due regard principle – and Article IX in general – is linked to Article VI of the Outer Space Treaty, which requires the appropriate State to authorise and continuously supervise national (governmental and non-governmental entities) space activities.²⁷ Taken together these Articles, Article VI, function as the enforcement mechanism for the due regard principle. As States are internationally responsible for all national activities, they must ensure – through licensing, authorisation and national regulatory frameworks – that both governmental and non-governmental entities comply with the due regard principles. Secondly, the concept of due regard is linked to environmental obligations, as enshrined in Article IX,²⁸ which provides that States shall avoid the harmful contamination of outer space, including the moon and other celestial bodies.²⁹ This also establishes an environmental dimension to the due regard principle. Based on this, States must assess environmental risks and prevent activities that could degrade the outer space environment. This is also linked to the UN Space Debris Mitigation Guidelines³⁰ and Long-term Sustainability Guidelines,³¹ which operationalise the principle in practice. Although these instruments are not legally binding, they specify exact measures – such as minimising debris generation, ensuring post-mission disposal, sharing information and conducting risk assessments – that reflect what the due regard principle requires in contemporary practice.

Furthermore, the due regard principle mirrors well-established norms in international environmental law. It is conceptually aligned with the no-harm rule, a long-established principle first recognised in the 1941 Trail Smelter Case and declared in Principle 2 of the Rio Declaration and Principle 21 of the Stockholm Declaration. In environmental law, States must ensure that activities within their jurisdiction do not cause significant transboundary

²⁷ Outer Space Treaty, Article VI; see more in GANCZER 2024: 209–237.

²⁸ Outer Space Treaty, Article IX.

²⁹ Outer Space Treaty, Article IX.

³⁰ United Nations Office for Outer Space Affairs 2010.

³¹ United Nations Committee on the Peaceful Uses of Outer Space 2019.

harm and must exercise due diligence, including conducting environmental impact assessments and engaging in consultation prior to activities that may have harmful effects.³² Similarly, in space law, due regard entails risk assessment, transparency and preventive measures to avoid significant interference or environmental degradation. Therefore, in space law, the due regard principle functions as an environmental due diligence obligation, which requires States to take reasonable measures to prevent harmful contamination and protect the shared outer space environment for present and future participants. In the 2025 advisory opinion on *Obligations of States in Respect of Climate Change*, the International Court of Justice (ICJ) also emphasised that States must take preventive measures, rely on the best available science and co-operate in order to avoid significant environmental harm.³³

Finally, it is essential to differentiate the principle of due regard from the concept of due diligence. While due regard requires States to show respect and consider the rights and interests of others during operations, due diligence is generally understood as the general duty of States not to “allow knowingly their territory to be used for acts contrary to the rights of other States”.³⁴ Due diligence can also be interpreted as a legal obligation to investigate before taking any action to prevent harm to others.³⁵ In this context, due regard involves striking a balance between interests as a procedural matter and due diligence as a more concrete obligation to take preventative measures to avoid harm. However, it is essential to note that there is often a relationship between these two terms, as due diligence obligations frequently stem from a general duty of due regard. Or in general, due regard can be interpreted as giving rise to a duty of due diligence.³⁶ This reasoning supports the interpretation of Article IX of the Outer Space Treaty. The ‘due regard’ obligation likewise reflects a preventive,

³² United Nations 1992: Principle 2, Principle 17, Principle 19; United Nations 1972: Principle 21.

³³ *Obligations of States in Respect of Climate Change*, Advisory Opinion, 23 July 2025.

³⁴ *Corfu Channel* (United Kingdom of Great Britain and Northern Ireland v. Albania), Judgment of 9 April 1949, I.C.J. Reports 1949, 22.

³⁵ FOSTER 2021: 89–91.

³⁶ HOBE et al. 2017: 593.

science-based standard of conduct requiring risk assessment, mitigation and consultation. The advisory opinion thus strengthens understanding of due regard in space law as a concrete due diligence obligation rather than merely a political principle.

As a summary, the ‘due regard’ principle requires States to conduct their space activities with reasonable consideration or ‘proper care’ for the legitimate interests of other States in the peaceful exploration and use of outer space. In essence, it imposes a standard of conduct: a State must assess whether its planned activities could cause harmful interference and, where there is a risk, engage in prior consultation. In this regard, the due regard principle also creates a balance between the maximum rights of a State and avoiding harm to another space actor. The term of ‘interests’ is interpreted broadly to encompass operational, scientific, environmental, safety and access-related interests of other States. The principle is applied through good-faith assessment, transparency and consultation, before proceeding with activities that may significantly affect others.

Application of the due regard principle in practice

Despite its foundational role, the practical application of the due regard principle faces several challenges. The first is the absence of precise enforcement mechanisms. Article IX relies on good faith and diplomatic consultations, rather than coercive enforcement.³⁷ As a result, compliance with due regard obligations depends largely on mutual trust and political will.

A second challenge arises from the increasing involvement of private actors in outer space. The Outer Space Treaty places international responsibility on States for national activities in outer space, whether conducted by governmental or non-governmental entities, as explained above.³⁸ Therefore,

³⁷ CARPANELLI 2024: 35–58.

³⁸ Outer Space Treaty, Article VI.

States must ensure that private companies act with due regard to other space actors, including private actors. However, the complexity of enforcing the principle increases as commercial activities expand.

The third major challenge concerns technological asymmetry and power dynamics among States. As outlined above, the term ‘corresponding interests’ lacks a defined meaning, which can result in confusion and disputes among space actors. One perspective may regard this as a violation of the principle, while another may find it lawful. As explained in the previous section, the assessment of interests must be conducted on a case-by-case basis, taking into account the specific circumstances of each case. This means there is no universally applicable boundary that would definitely determine what constitutes a violation of the due regard principle, although such a measure would be needed.

INTERPRETATION OF THE HARMFUL INTERFERENCE PRINCIPLE

The concept of harmful interference occupies a central place in international space law. Its origins lie primarily in Article IX of the Outer Space Treaty, the second part of which declares:

[i]f a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration

and use of outer space, including the moon and other celestial bodies, may request consultation concerning the activity or experiment.³⁹

This section outlines a two-sided consultation process to prevent harmful interference in outer space. Firstly, the State that plans the activity shall undertake appropriate consultations in case of potential harmful interference. According to the interpretation of Article IX, this obligation must be fulfilled before the authorisation or commencement of the activity.⁴⁰ Conversely, the potentially affected State may request consultations. This can supposedly happen before or during the activity.⁴¹ However, it is important to note that Article IX does not grant the potentially affected State a right of veto or any other specific rights, but the purpose of this step also goes beyond mere formality. As a procedure or duty, its primary objective is to address potentially harmful situations before activities are conducted, thereby promoting the safe and sustainable use of outer space. In accordance with the rules of treaty interpretation under Articles 31–32 of the Vienna Convention on the Law of Treaties,⁴² Article IX may also be interpreted in good faith and in light of its object and purpose to cover situations where the risk of harmful interference materialises at a later stage (e.g. due to an orbital modification), thereby extending the duty to consult evolving and newly emerging risks. In any event, the primary recourse in the event of disputes would be diplomatic negotiations.⁴³

Although preventing harmful interference is one of the most fundamental principles of international space law, the term ‘harmful interference’ remains undefined. The concept partially overlaps with definitions found in telecommunications law. In accordance with the Radio Regulations, harmful interference is “interference which endangers the functioning of a radionavigation service or of other safety services [...] seriously degrades, obstructs, or

³⁹ Outer Space Treaty, Article IX.

⁴⁰ HOBE et al. 2017: 581–583.

⁴¹ HOBE et al. 2017: 581–583.

⁴² VCLT 1969, Articles 31–32.

⁴³ VON DER DUNK 2015: 87–89.

repeatedly interrupts a radiocommunication service”.⁴⁴ Therefore, the ITU law defines harmful interference as an effect that endangers the functioning of radionavigation or safety services, or seriously degrades or repeatedly interrupts authorised communications. Furthermore, it is important to mention the Artemis Accords, unveiled by the United States of America on 13 October 2020. The Accords are not an international treaty but rather a political commitment, yet they may influence the development of the normative framework,⁴⁵ as evidenced by the fact that, as of 26 January 2026, the Accords have 61 signatories.⁴⁶ Section 11 of the Accords explicitly refers to Article IX and affirms that activities should be conducted to avoid harmful interference. However, it goes further by introducing practical co-ordination mechanisms. Based on the Accords, signatories commit to notifying relevant actors of their activities and to co-ordinating operations in order to prevent conflicts, particularly in the context of lunar surface activities and resource utilisation.⁴⁷ The Accords also introduce the concept of ‘safety zones’, which are operational co-ordination areas intended to prevent harmful interference by providing transparency about the location and nature of activities.⁴⁸ This also supports the view that harmful interference is not limited to technical disruptions, such as radio-frequency interference, but also includes physical obstructions, operational conflicts, or activities that could compromise the safety of personnel, equipment or missions. The emphasis on transparency, prior notification and real-time co-ordination appears as a tool of prevention in this context. As such, the Accords transform the open-structured consultation mechanism of Article IX into a more detailed obligation, where harmful interference means a trigger for information-sharing, co-ordination, making it into an operational mechanism.

In addition, although ‘harmful interference’ as a term does not explicitly appear in other fields of international law, there are structurally comparable concepts in several other fields. Firstly, in air law, under the Chicago

⁴⁴ International Telecommunication Union 2020: Section VII.

⁴⁵ BARTÓKI-GÖNCZY – NAGY 2024: 146.

⁴⁶ NASA 2020.

⁴⁷ NASA 2020: Section 11 (2), (3).

⁴⁸ NASA 2020: Section 11 (7).

Convention, interference is framed primarily as a matter of safety and security (e.g. the prohibition of the usage of weapons against aircraft⁴⁹) and is linked to the protection of civil aviation. Secondly, in the law of the sea under the UNCLOS, the emphasis lies on the obligation to give 'due regard' to the rights of other States, addressing interference by balancing sovereign rights.⁵⁰ Finally, in international environmental law, the comparable concept is the no-harm rule. In this case, this principle is reflected in Principle 21 of the Stockholm Declaration and Principle 2 of the Rio Declaration, which requires States to prevent significant transboundary harm.⁵¹ In the context of space law, the term has a similar, broader meaning. The term should encompass any action that significantly disrupts another State's legitimate use of outer space – whether physical, electronic or environmental. It therefore encompasses not only radio-frequency interference or telecommunications services, but also any interference with the operations of other States, such as physical interference (e.g. manoeuvres that hinder other operations, close-proximity operations or intentional destruction), observational interference (e.g. activities that hamper ground-based or space-based observation systems) and so on. In other words, it can be divided into kinetic (e.g. ASAT missiles) and non-kinetic (e.g. jamming, laser and cyber operations, spoofing) measures.⁵²

Furthermore, it is not determined whether there is a minimum extent the interference must reach or where the boundary lies. We can generally say that the risk of 'harmful interference' must be real and reasonably foreseeable, not merely hypothetical or speculative. The threshold is generally understood as one of credible risk of significant interference, assessed in good faith and on the basis of available scientific and technical information. Minor, remote, or purely theoretical risks would not normally trigger the consultation obligation. However, if there is a credible likelihood that an activity could substantially harm another State's space operations, access, safety or use of outer space, the duty to consult arises. The standard, therefore,

⁴⁹ Chicago Convention, Article 3 bis.

⁵⁰ UNCLOS, Preamble, Article 56.

⁵¹ United Nations 1992: Principle 2; United Nations 1972: Principle 21.

⁵² BLACK 2008: 5.

suggests a due diligence threshold. It is not necessary that harm be certain or imminent, but there must be a serious and objectively assessable risk.⁵³ For example, if a State plans to conduct a kinetic ASAT test that could generate long-lived orbital debris intersecting commonly used satellite orbits, the foreseeable risk of debris collisions would constitute a real threat of harmful interference, thus triggering Article IX consultations. By contrast, a routine satellite manoeuvre conducted in compliance with established space traffic co-ordination practices, posing only a negligible collision probability, would likely fall below the threshold. The key question is whether a reasonable State, acting in good faith and informed by technical data, would consider the activity capable of causing significant interference with others' lawful space activities or not.

As a summary, Article IX concerns consultations regarding activities that are important to the acting State, but that may risk harmful interference with others. It requires genuine, good-faith consultations aimed at preventing harm, not a mere procedural formality. At the same time, it does not grant potentially affected States a veto. Instead, it strikes a balance: before significant harm occurs, States must engage in meaningful dialogue and take appropriate preventive measures to avoid harmful interference.

Practical application of the harmful interference principle

Although the principle is considered one of the most important in space law, its practical application poses significant challenges. The core difficulty in enforcing the principle lies in risk assessment. A State may be unable to properly assess whether its planned activity poses a threat to others, as it lacks complete or reliable information about the space object or the activity of other space actors in general. Although the Outer Space Treaty⁵⁴ and the Registration Convention establish a duty to register space objects,⁵⁵ compliance remains imperfect, and around 12% of space objects remain

⁵³ BEARD–STEPHENS 2024: 177–184.

⁵⁴ Outer Space Treaty, Article VIII.

⁵⁵ Registration Convention, Article II.

unregistered.⁵⁶ More importantly, there is no comprehensive, binding global Space Traffic Management (STM) regime that ensures full transparency into orbital positions and manoeuvres. As a result, States often depend on external data sources, including commercially operated open-access databases provided by private actors such as SpaceX.⁵⁷ This raises further questions. If decisions are based on privately generated tracking data, does the provider assume any responsibility for inaccuracies, and if liability is contractually excluded, can a State be faulted for declining to rely on such information? The absence of transparent data sharing and the prevalence of dual-use technologies make it nearly impossible to prove if or which State caused harmful interference.

Another problem is the lack of a clear legal definition. As explained, the term 'harmful interference' is not precisely defined, leaving States to interpret it subjectively. Therefore, what one State may perceive as harmful, another might view as a legitimate action. This undermines predictability and consistency in applying the principle and discourages enforcement actions. Moreover, the proliferation of space debris also causes serious challenges. Many incidents that can be considered 'harmful' result from previous accidents, collisions and the long-term accumulation of space debris. The difficulty of assigning responsibility for debris-related interference weakens the effect of Article IX, as no clear actor can be held accountable, or the causality cannot be established.⁵⁸

Finally, the absence of a universally accepted enforcement mechanism leaves the harmful interference principle largely reliant on diplomatic measures, rather than legal solutions. Although Article IX provides for consultations between States to resolve potential conflicts,⁵⁹ there is no standing international body to resolve them, nor is there any international body with binding authority in this matter.⁶⁰ Mechanisms like the UN COPUOS facilitate dialogue, but lack enforcement power, and the ICJ

⁵⁶ United Nations Office for Outer Space Affairs s. a.

⁵⁷ Starlink s. a.

⁵⁸ VON DER DUNK 2015: 89–90; KAISER 2022: 585–587.

⁵⁹ Outer Space Treaty, Article IX.

⁶⁰ VON DER DUNK 2015: 87–89.

has never ruled on such a case. As a result, compliance depends more on political will and mutual restraint than on legal compulsion.

THE RELATIONSHIP BETWEEN THE DUE REGARD AND HARMFUL INTERFERENCE PRINCIPLES

The relationship between the principles of ‘due regard’ and ‘harmful interference’ under Article IX of the Outer Space Treaty reveals a balanced normative framework governing activities in outer space. Together, they form an integrated ‘preventive mechanism’ designed to reconcile freedom of exploration, use and scientific investigation of outer space with the protection of the space activities of all space actors.

Article IX contains both a general standard of conduct and a more specific procedural obligation. In this context, ‘due regard’ operates as a broad principle, requiring States to conduct their space activities with reasonable consideration for the corresponding interests of others,⁶¹ as explained in the previous sections. Therefore, it also reflects the idea that outer space, while not subject to national appropriation based on Article II of the Outer Space Treaty,⁶² is a domain of shared use in which activities must be co-ordinated through mutual respect and co-operation among space actors.⁶³ By contrast, ‘harmful interference’ represents the operational threshold at which the general duty crystallises into a concrete procedural obligation. Where a State has reason to believe that its planned activity would cause potentially harmful interference with the activities of other States, it must undertake appropriate international consultations, as explained above.⁶⁴ Thus, harmful interference functions as the triggering condition that activates the consultative mechanism embedded in Article IX. Therefore, due regard provides the overarching standard, while harmful interference defines the point at which that standard requires specific procedural action.

⁶¹ CARPANELLI 2024: 35–58.

⁶² Outer Space Treaty, Article II.

⁶³ Outer Space Treaty, Article IX.

⁶⁴ Outer Space Treaty, Article IX.

It is also important to highlight that both principles are preventive in nature, as explained above. They operate before damage occurs and are distinct from *ex post* liability regimes declared by the Liability Convention and Article VII of the Outer Space Treaty. The focus is not on fault or causation after harm has materialised, but on identifying risks in advance and mitigating them through dialogue and co-operation. Due regard, therefore, requires States to assess the broader impact of their activities. Similarly, harmful interference identifies the level of risk that cannot be ignored. Importantly, the threshold is not actual damage but a credible risk of significant disruption to another State's peaceful use of outer space, as explained above. In this sense, harmful interference gives concrete meaning to due regard, it translates a general standard of mutual consideration into a legally structured response mechanism.

The interaction of these principles also reflects the foundational balance within the system of the Outer Space Treaty. Outer space is governed by the principle of the freedom of use, exploration and scientific investigation for all States.⁶⁵ At the same time, such freedom is not absolute, there are several limitations in the Outer Space Treaty itself and also in general international law and other specific parts of it. Due regard also limits these freedoms by embedding them within a relational framework. States can have their national interests, but they must do so in a way that respects the legitimate interests of others. Similarly, harmful interference represents the legal boundary of acceptable conduct within that freedom. When activities cross into significant risk to others' operations, consultations become mandatory. Yet, Article IX does not create a veto right for affected States,⁶⁶ as mentioned above, therefore, it preserves a balance: the acting State retains freedom of action, but it must engage in good-faith dialogue and consider preventive adjustments. In this sense, the relationship between the two principles can be described as complementary. Due regard is the normative standard and harmful interference is the procedural safeguard.

The effective operation of this structural relationship depends on transparency and information-sharing. Without reliable data on orbital

⁶⁵ Outer Space Treaty, Article I.

⁶⁶ BEARD-STEPHENS 2024: 177–184.

positions, manoeuvres and operational intentions, States may struggle to determine whether a planned activity reaches the harmful interference threshold, as explained above. The absence of a binding global Space Traffic Management system further complicates the practical implementation of due regard. Consequently, the structural integrity of Article IX increasingly relies on co-operative data exchange, notification practices and good-faith engagement between States and private actors.

APPLICATION OF THE DUE REGARD AND HARMFUL INTERFERENCE PRINCIPLES IN ARMED CONFLICT

The principles of ‘due regard’ and ‘harmful interference’ form mutually reinforcing norms, which retain their relevance even during armed conflicts, as explained above. The Outer Space Treaty prohibits the placement of weapons of mass destruction in orbit and the militarisation of celestial bodies⁶⁷ while permitting non-aggressive military uses of outer space, such as communications, surveillance and navigation.⁶⁸ Within this framework, the obligation of ‘due regard’ under Article IX requires States to conduct their space-related activities responsibly, even during hostilities, taking into account the interests of other States.⁶⁹ Complementing this, the principle of harmful interference prohibits actions that adversely affect the space activities of other States, whether through physical, electronic or cyber means.⁷⁰ Together, these principles provide both legal and ethical guidance for the conduct of military operations in outer space, as demonstrated above.

Firstly, in the context of IHL, it is important to note that the ‘due regard’ principle remains relevant and IHL principles need to be considered in conjunction with this obligation to ensure that military actions are conducted responsibly and lawfully, as explained above.⁷¹ The principle of military

⁶⁷ Outer Space Treaty, Article VI.

⁶⁸ BARTÓKI-GÖNCZY – SÜLYÖK 2022: 81.

⁶⁹ Outer Space Treaty, Article IX.

⁷⁰ POIRIER 2024: 4.

⁷¹ BEARD – STEPHENS 2024: 170–176.

necessity requires that military actions be conducted for a legitimate military purpose and that the action must weaken the military capacity of the other State parties to the conflict.⁷² Therefore, for instance, the destruction of a satellite in armed conflict that has a purely scientific purpose, like the Hubble or James Webb space telescopes, would violate the mentioned principle, as the action would not result in a military advantage. Another key element of 'due regard' in armed conflict relates to the use and targeting of space objects. Based on the principle of distinction, Parties to a conflict must always distinguish between civilians and combatants, and civilian and military objects.⁷³ Consequently, concerns may arise about dual-use systems. Many satellites serve both civilian and military functions, such as communications or EO. Attacking or interfering with such systems during armed conflicts could have disproportionate and indiscriminate effects on civilian services. Here, the due regard principle functions as a practical and ethical constraint, encouraging States to adopt alternative means that minimise collateral harm and to co-ordinate, where possible, with other actors to prevent unintended interference. However, it can also be stated that, despite civilian services, as long as the satellite continues to contribute to military operations, its destruction does not violate the principle of distinction. This is also connected to the principle of proportionality, which states that the harm to civilians and civilian property from an attack cannot be excessive when weighed against the anticipated military advantage of the attack.⁷⁴ When applying the principle to outer space, the test of proportionality should be taken into account, and it must be investigated whether the collateral damage would be excessive when measured against the direct military advantage the given action could achieve.⁷⁵ Military operations that seek to disable or destroy satellites – whether for strategic or tactical advantage – inherently risk causing widespread and long-lasting debris, thereby endangering the peaceful uses of outer space by all. In this context, the principle of due regard complements IHL rules on distinction,

⁷² International Committee of the Red Cross s. a.

⁷³ American Red Cross 2024.

⁷⁴ International Committee of the Red Cross 2023.

⁷⁵ Medecins sans Frontieres s. a.

proportionality and precautions in attack. For instance, a kinetic ASAT test or strike that generates uncontrolled debris can be viewed as inconsistent with the obligation to act with due regard to the interests of other States and also with the prohibition of harmful interference principle, particularly if it jeopardises the safety of neutral satellites or civilian space infrastructure. It is important to note that although the Outer Space Treaty does not explicitly prohibit ASAT missiles, the use of such kinetic weapons clearly falls under the prohibition of harmful interference, as the term is intended to include all kinds of kinetic and non-kinetic measures,⁷⁶ as explained above. Finally, under IHL, belligerents must also avoid unnecessary suffering (principle of humanity). This means that the methods used in the armed conflict cannot be designed to cause unnecessary suffering or superfluous injury.⁷⁷ This principle is fundamental in the context of due regard in outer space. The mentioned weapons against combatants on Earth may be used from outer space. Therefore, it is essential to observe the obligations set out in international space law. As a self-restraint principle and ethical standard, the due regard obligation plays a vital role in this context.⁷⁸

Moreover, it must also be examined how the due regard principle relates to environmental obligations in armed conflict.⁷⁹ In the context of IHL, Additional Protocol I also declares that “[c]are shall be taken in warfare to protect the natural environment against widespread, long-term and severe damage”.⁸⁰ Consequently, belligerents shall undertake all appropriate measures to prevent harm to the outer space environment even in the

⁷⁶ BLACK 2008.

⁷⁷ American Red Cross 2024.

⁷⁸ AOKI 2022: 3.

⁷⁹ There is growing recognition among the international community that outer space can be viewed as an environment, and that international environmental law may be applicable there. In this context, international environmental law treaties (e.g. the 1972 Stockholm Declaration, 1992 Rio Declaration) provide guiding rules and principles regarding the protection of the outer space environment (e.g. the harm rule, prevention of transboundary harm, notification obligation, environmental impact assessment, etc.). In addition, the ENMOD Convention specifically mentions outer space in Article II, which prohibits environmental modification techniques (KECSKÉS 2024: 248).

⁸⁰ Additional Protocol I, Article 55.

case of armed conflict. The due regard principle supports this obligation, obligating States to avoid collateral damage and the creation of space debris, and to take into account the rights and interests of other States.

Finally, while no formal enforcement mechanisms exist, the due regard obligation may serve as a basis for post-conflict accountability and diplomatic assessment. Actions during armed conflict that cause long-term, indiscriminate harm to the space environment could be considered violations not only of IHL but also of peacetime obligations under the Outer Space Treaty. In this sense, the principle provides a normative bridge between peacetime and wartime regulation, reaffirming that the domain of outer space must remain governed by the shared responsibility of all States to act with foresight, restraint and mutual respect.

Secondly, in contemporary warfare, attacks against satellites represent a tangible and growing threat. Such attacks may occur through kinetic or non-kinetic means, as explained above. In recent years, a new method of interference has emerged in the form of cyber operations, and it remains unclear whether the principle of harmful interference can be invoked in this context. Cyber operations present particular challenges, as identifying the attacker's IP address, the start time of the operation and all intended targets is often difficult.⁸¹ In the telecommunications domain, the ITU has called on member States to ratify the Budapest Convention on Cybercrime (2001) to enable the criminalisation of cyber offences directed against States.

Based on these, it is important to note that the principle of harmful interference may also be invoked in the context of armed conflicts, provided that specific conditions are met. First, the harmful interference must occur within the framework of the armed conflict and be attributable to a party to that conflict. Second, it must be undertaken for the purpose of contributing to military operations or disrupting humanitarian assistance.⁸² During armed conflicts, IHL governs the conduct of hostilities, including attacks on military objectives. At the same time, the Outer Space Treaty and related norms impose additional limitations, as demonstrated above. The principle of harmful interference complements IHL rules on distinction

⁸¹ POIRIER 2024: 4.

⁸² TAKAYA-UMEHARA 2019.

and proportionality by discouraging indiscriminate or large-scale disruption of space systems. For example, in the case of dual-use satellites, any damage could have far-reaching consequences for global communications, weather forecasting and navigation.⁸³ Therefore, even if a State claims that interference is justified under IHL, it may still breach its obligations under the Outer Space Treaty if the interference contravenes international space law. As an example, although the use of force in self-defence under Article 51 of the Charter of the United Nations⁸⁴ may be lawful, this does not automatically displace the applicability of Article IX, rather, the two regimes must be read together, meaning that even a permitted use of force must, as far as possible, comply with the due regard and harmful interference obligations. This interplay between the two regimes illustrates that space law and IHL must be interpreted in a mutually reinforcing, rather than mutually exclusive, manner.

Recent armed conflicts also illustrate the practical application of these principles. The Russian–Ukrainian conflict highlights how dual-use and civilian space assets have been employed for military, defensive and humanitarian purposes. Ukraine and its partners have relied on commercial satellite imagery, Earth observation data and communication networks to support situational awareness and co-ordination of humanitarian assistance.⁸⁵ Such use aligns with the due regard principle, as it seeks to balance military necessity with protection of civilian services and the rights of neutral States. In contrast, Russian operations include GPS jamming, signal interference and cyberattacks against satellite systems.⁸⁶ These actions arguably violate both the due regard obligation and the principle of harmful interference, as they disregard the legitimate interests of other States and threaten the safety of civilian and neutral space infrastructure.

One of the most notable cases of the conflict was the Viasat KA-SAT cyberattack, which targeted a commercial satellite network providing communication services between Europe and, therefore, affected services

⁸³ HANSEN 2015: 44–50.

⁸⁴ UN Charter, Article 51.

⁸⁵ CLONTS 2023.

⁸⁶ CLONTS 2023.

not only for Ukraine but also for France, Germany, Hungary, Greece, Italy and Poland.⁸⁷ The incident, therefore, demonstrated the transboundary consequences of irresponsible space operations. The incident also illustrates a new form of harmful interference, namely cyber operations. This raises significant legal questions about the consequences of cyberattacks conducted during armed conflicts that have detrimental effects on non-belligerent States and civilian infrastructure. Other examples of the violation of the harmful interference include widespread GPS jamming and signal disruption conducted by Russian forces near conflict zones and border regions. These operations not only impaired Ukrainian military operations but also international civil aviation and maritime security.⁸⁸

While formal enforcement mechanisms remain limited, these principles serve as a bridge between peacetime and wartime obligations, providing a framework for accountability, diplomacy and normative expectation. Actions causing indiscriminate or long-lasting harm to the space environment could constitute violations of both IHL and the Outer Space Treaty, emphasising the shared responsibility of all States to act with foresight, restraint and mutual respect. In the New Space Age, these norms require States to co-ordinate their operations, consider the legitimate expectations of others, and integrate precautionary measures into the planning and execution of military activities. In conclusion, the Russian–Ukrainian conflict demonstrates that the principles of due regard and harmful interference remain legally binding. Their integration provides a coherent framework for regulating military activities in space, ensuring that operations are conducted responsibly, dual-use assets are assessed appropriately, and the long-term sustainability and safety of outer space are preserved. Strengthening international co-ordination, promoting norms of responsible behaviour, and developing clear guidance for dual-use and cyber-enabled operations are necessary steps to prevent escalation, uphold international law.

⁸⁷ POIRIER 2022: 6.

⁸⁸ CLONTS 2023.

CONCLUDING REMARKS

The increasing connection between outer space and military operations on Earth represents one of the most profound transformations in the conduct of warfare. The principles of due regard and harmful interference remain among the few that seek to preserve outer space as a domain of peaceful co-operation, even amid geopolitical tensions and armed conflict. This study has demonstrated that these principles, while formulated in a different technological era, continue to hold significant legal, ethical and operational relevance in the contemporary 'New Space Age'.

The principle of due regard demands that States exercise their freedoms in outer space responsibly, mindful of the corresponding interests of others. In the context of armed conflict, it serves as a restraint mechanism that links peacetime obligations to wartime conduct. The principle obliges belligerents to consider the broader implications of their military actions, not only in terms of immediate tactical advantage but also in light of long-term impacts on the sustainability of the orbital environment and the safety of neutral States. As such, it functions as a moral guideline in a domain where law, ethics and technology intersect. Similarly, the prohibition of harmful interference represents a cornerstone of responsible space operations. Its relevance in the era of hybrid and cyber warfare is significant. The concept's flexibility allows it to encompass new forms of interference, ranging from kinetic ASAT operations to non-kinetic jamming and cyberattacks. However, its unclarity also poses a risk, without clearer definitional and procedural standards, States may interpret or exploit this ambiguity to justify aggressive conduct. The Russian–Ukrainian conflict has illustrated this tension. The Viasat KA-SAT cyberattack and widespread GPS jamming demonstrated that harmful interference can now manifest in digital form, blurring the boundaries between the space and cyber domains. These incidents underline the need to refine the interpretation of 'harmful interference' to include cyber operations that degrade or disable space-based infrastructure.

The interplay between space law and IHL further underscores the enduring relevance of both principles. The principles of military necessity, distinction, proportionality and humanity resonate closely with the due

regard obligation. Together, they create a complex legal framework that fills the gap between freedom of military use and the preservation of outer space as a safe domain. Yet, the lack of enforcement mechanisms renders these obligations largely dependent on voluntary compliance, diplomatic interests and political will. The Outer Space Treaty, while fundamental, was never designed for the complexities of dual-use satellites, private actors and cyber-enabled operations. Therefore, future legal instruments (e.g. treaties, declarations, soft law documents) should define thresholds for harmful interference and due regard, establish consultation protocols for space-related military activities and create clear enforcement standards.

As a summary, the due regard and harmful interference principles, despite their ambiguities, continue to provide a vital ethical and legal framework. They remain a reminder that even in conflict, outer space must remain guided by co-operation and mutual assistance and used for peaceful purposes. Thus, the challenge for the coming decades is clear: to transform these fundamental principles from abstract ideals into enforceable standards.

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Boudour Mefteh

RECONNAISSANCE SATELLITES IN
MODERN WARFARE: ESPIONAGE OR
LEGITIMATE SURVEILLANCE?

Addressing Their Legal Status
and Regulatory Gaps

*“The first Sputnik contained infra-red
devices to map the United States
for targeting purposes.”¹*

INTRODUCTION

The development of modern warfare, coupled with the rapid growth of reconnaissance satellites, has given intelligence gathering a highly developed and indispensable instrument for military operations. This paper refers to intelligence gathering as the collection of sensitive or military-related data by spy satellites. These space assets enable real-time battlefield monitoring, precise strategic planning and informed decision-making at both the operational and political levels. The increasing reliance on satellite reconnaissance raises complex legal uncertainties at the intersection of space law and telecommunications regulation.²

Historically, during periods of increased international tensions, states have used espionage to gather sensitive information, stop potential threats and monitor foreign political or military activity. Such actions have long been recognised as strengthening a nation's strategic and defensive position.³ Surprisingly, although it remains hidden through often-imposing methods,

¹ GARTHOFF 1958: 134.

² Columbia Law Review 1961: 1075.

³ Columbia Law Review 1961: 1075.

we cannot deny that espionage has traditionally had an ambiguous status in international law and still does, as this paper will demonstrate. Furthermore, technology has vastly expanded the tools available to intelligence gathering. Beyond classic human and electronic surveillance, states have employed aircraft and high-altitude balloons⁴ extensively for surveillance and reconnaissance missions.⁵ In the space arena, it would stand to reason that satellite-based reconnaissance and intelligence-gathering activities could sensibly be addressed under the same principles of law. That is, one would view such reconnaissance as a breach of international law only if the methods employed therein already represent a separate violation of accepted legal norms, such as unwarranted intrusion on territorial sovereignty or prohibited disruption of communications systems; in other words, the method by which it is carried out could make it either legal or illegal. This position suggests a continuity between traditional espionage activity and contemporary space-based intelligence, indicating both the legal ambiguity and the operational necessity of reconnaissance in modern strategic relations.⁶

Before jumping into what this article addresses explicitly regarding reconnaissance satellites, a general definition of the term is required. Depending on Professor Frans von der Dunk: “A ‘satellite’, the obvious *prima facie* target of ‘international space law’, whatever precisely it is, is best characterised as ‘a manufactured object or vehicle intended to orbit the earth, the moon, or another celestial body’”.⁷ Describing that as, since mention of “orbits” around various celestial bodies, including Earth, means that satellites are operating in outer space, the three main sectors making up such satellite operations, and therefore subject to something which can be called ‘international satellite law’, that could be divided in three categories: satellite communications, satellite remote sensing (satellite Earth observation), and satellite navigation, which are all orbit-related to the Earth. In a legal context, all three are subject alternatively to general

⁴ GALLIFORD 2024.

⁵ Columbia Law Review 1961: 1075.

⁶ Columbia Law Review 1961: 1075.

⁷ Merriam-Webster s. a. cited by VON DER DUNK 2019.

international space law and, in addition, each sector is subject to its own international regime.⁸

The term 'spy satellites' is not a legal term, but it is commonly recognised as such. It is more frequently used, as it is charged with powerful historical and political reasons. It emerged during the Cold War, capturing the public imagination and being perceived as a means for confidentiality, espionage and power projection. It is still widely used in the media and public discourse today as a controversy over sovereignty and security. In contrast, 'reconnaissance satellite' is the legal term that highlights their strategic intelligence-gathering.

Another reason is that "[w]hile discussion of reconnaissance satellites has continued for some time, no significant attempts to define precisely the term 'reconnaissance' or other important terms have apparently been made",⁹ especially from a legal perspective. Despite this ambiguity, we can say that reconnaissance is defined as a "mission to obtain information through visual observation or detection methods about the activities and resources of a target, aimed at gathering comprehensive data without direct contact".¹⁰

To make it simpler, we can say that spy satellites, or, more officially, reconnaissance satellites, are observation spacecraft in space used by governments to monitor activities on the ground for national defence purposes secretly.¹¹ They are high-tech 'eyes in the sky', peering down from space to assess foreign military forces, weapons programs, missile test launches and other strategic targets. The primary task of a reconnaissance satellite is to provide essential surveillance intelligence that may otherwise be unattainable or difficult to obtain, all without violating sovereign airspace. In essence, these satellites allow countries to spy on each other at the impersonal distance of space, offering a continuous stream of imagery and information to inform military planning, treaty monitoring and threat estimation.¹² By capturing precise photos, radar charts, or tapping into electronic signals,

⁸ VON DER DUNK 2019.

⁹ SORAGHAN 1967.

¹⁰ Elsevier s. a.

¹¹ FRĄCKIEWICZ 2025.

¹² FRĄCKIEWICZ 2025.

reconnaissance satellites put policymakers in the lead, uncovering hidden missile bases, tracking troops moving into place, and alerting leaders to impending danger.¹³

The history of reconnaissance satellites has spanned from the Cold War period, as mentioned above, to the contemporary world, revealing how they have evolved from testing tools to critical instruments of global security.¹⁴ It began in the late 1950s, when the Soviet Union launched Sputnik 1, prompting the United States to recognise the strategic advantages of space monitoring.¹⁵ The U.S. responded by initiating the top-secret CORONA program in 1958, officially camouflaged as the 'Discoverer' scientific flights, which successfully recovered photographic and video footage of Soviet terrestrial targets and, by 1961, revealed missile sites that exposed the 'missile gap' myth and directly affected U.S. defence policy.¹⁶ At the same time, the Soviet Union initiated its own Zenit program, a Vostok capsule-based design that carried cameras instead of a cosmonaut.¹⁷ Both superpowers expanded their capabilities with the U.S. Gambit system for high-resolution imagery and the KH-9 Hexagon for broad-area mapping, which by the early 1970s had become essential not only for intelligence but also for verification of arms control treaties.¹⁸

The next great leap was the digital revolution in 1976, with the KH-11 Kennen, which provided real-time electronic imaging equal to the telescope design of the Hubble, enabling nearly instant transmission of intelligence, something the Soviets attempted but never came close to.¹⁹ Further, by the late 1980s, the U.S. also diversified its surveillance with the Lacrosse radar satellites capable of imaging through clouds and darkness, along with Sigint intercepts of messages and Vela tracking nuclear tests, thus

¹³ FRĄCKIEWICZ 2025.

¹⁴ FRĄCKIEWICZ 2025.

¹⁵ TABOR s. a.

¹⁶ FRĄCKIEWICZ 2025.

¹⁷ FRĄCKIEWICZ 2025; Bean 2025.

¹⁸ FRĄCKIEWICZ 2025.

¹⁹ FRĄCKIEWICZ 2025.

having a complete array of Imint, Elint and nuclear surveillance assets.²⁰ After the Cold War, these capabilities only grew but did not diminish: the U.S. National Reconnaissance Office developed follow-ons to KH-11 with global instant access through commercial relays, while Russia, long delayed by economic crises, finally brought the Persona and Liana systems to the field, and new entrants such as France with Helios, and later China, India and Japan joined the growing multipolar space-based intelligence market.²¹

However, one of the main challenges facing their legal framework is that current space and telecommunications treaties do not distinguish between routine monitoring and 'spying', nor do they fully address the use of satellites to intercept or jam signals. The principal space law treaty, the Outer Space Treaty (OST), requires the use of outer space to be for 'peaceful purposes' in Article I, bans weapons of mass destruction in orbit, and, by omission, permits conventional military uses specifically in Article IV.²² In the same manner, the International Telecommunication Union (ITU), even if it allocates radio frequencies and prevents harmful interference, does not explicitly address military intelligence gathering or signal intercepts.²³

In that case, states have, in practice, developed their own understandings; satellites used for reconnaissance are universally accepted as 'peaceful', nonhostile applications of outer space,²⁴ but interrupting communications sent by another party is generally considered classical espionage. These juridical gaps raise significant issues of sovereignty, privacy and international security: Does a satellite in operation signal intelligence over the territory of a foreign nation against sovereignty, and if an intelligence or spy satellite is deliberately destroyed, does such an act amount to aggression or legitimate targeting of a military target? The ambiguity on such issues underscores the need for more specific legal parameters to regulate the increasingly widespread strategic use of spy and reconnaissance satellites in modern military affairs.

²⁰ TABOR S. a.

²¹ FRĄCKIEWICZ 2025.

²² United Nations Office for Outer Space Affairs 1967.

²³ KEIR 2021.

²⁴ SORAGHAN 1967.

Using a qualitative approach, this paper examines whether reconnaissance satellites are tools of espionage or legitimate surveillance, analyses their legal status to expose their typically unclear position in international law, and puts the question in concrete terms by examining instances of their use in current military and intelligence operations. This paper will use the terms ‘spy’ and ‘reconnaissance’ satellites interchangeably.

TERMINOLOGY CLARIFICATION

Satellites have become a central tool for states that desire to strengthen their national security capacity and maintain a strategic advantage over potential competitors. In the introduction of this paper, we sought to clarify what is meant by ‘spy satellites’, presenting their legal status as reconnaissance satellites; however, a deeper terminology is still needed, especially when we try to answer the following question: What is espionage? And how is it different from legitimate surveillance?

In international customary law²⁵ and the law of international humanitarian law (IHL), espionage in the context of an international armed conflict is well defined. However, the actual measures for collecting information are neither specified nor prohibited.²⁶ As the International Committee of the Red Cross describes it, ‘espionage’ is the “gathering or attempting to gather information in territory controlled by an adverse party through an act undertaken on false pretences or deliberately in a clandestine manner”.²⁷

To make the separation from legitimate surveillance easier, we can refer to the ‘Liberty to Spy’ book,²⁸ in which the author made a definition of ‘espionage’ depending on specific characteristics, as follows:

²⁵ International Committee of the Red Cross s. a.

²⁶ FANG et al. 2023.

²⁷ FANG et al. 2023.

²⁸ LUBIN 2020: 190.

- The operation occurs in Peacetime.
- The operation involves passive gathering, analysis, verification, and dissemination of information of relevance to a State or States' "decision-making process" and in the service of some State interests.
- The operation involves some degree of secrecy and confidentiality as to both the needs behind the operation and the specific methods of collection and analysis employed so to ensure its effectiveness. These [...] operations would often be coupled with some degree of deceitful intent on the part of the Surveilling State(s), though such is not always mandated.²⁹

From what has been presented, we note that the legal distinction between satellite espionage and legitimate satellite surveillance depends on the activity's aim (simple observation vs. interception or interference), the other state's consent, and whether the means themselves violate other international law norms.³⁰ As a result, we can say that legitimate surveillance satellites are launched openly and legally to enhance situational awareness, support national security, and facilitate international cooperation in a respectful attitude towards other states' sovereignty. On the contrary, reconnaissance satellites operate secretly, aggressively penetrating another nation's military, strategic, or communications systems to gather intelligence at will.³¹ As legal systems collect data for defensive or cooperative purposes, spy satellites deliberately infringe on the informational and territorial sovereignty of targets, raising complex legal and ethical issues under international law.

²⁹ LUBIN 2020: 190.

³⁰ SORAGHAN 1967.

³¹ Space Mesmerise 2023.

THE LEGAL CHARACTERISATION OF
RECONNAISSANCE SATELLITES

*The application of the Outer Space Treaty
on reconnaissance satellites*

As a start, we need to make it clear that international law does not explicitly prohibit the use of satellites to gather intelligence, as they are primarily and directly regulated under space law.³² The OST is the foundational space law instrument; most notably, it bans the placement of nuclear or other weapons of mass destruction in Earth orbit or on the Moon, and requires that the Moon and other celestial bodies be used for peaceful purposes. In light of this, the OST, in its Article 1, explicitly declares that “outer space is free for exploration and use by all nations” and forbids any state from claiming sovereignty over outer space or celestial bodies. This means that using space technology, such as satellites, is also open to all nations without discrimination. As a result, we can understand that no state shall use it in a way that produces any form of discrimination, including spying on another country using high-quality intelligence to obtain non-public/secret information. Notably, the OST requires ‘peaceful’ uses of outer space; however, the first challenge is that it did not clearly define this notion, which is one of its key gaps and has led to it being interpreted differently over the years, mainly by space-faring nations.³³

Due to this ambiguity, the United States has generally interpreted ‘peaceful purposes’ as ‘non-aggressive’. In contrast, the Soviet Union traditionally favoured a ‘non-military’ interpretation, reflecting differing approaches to the permissibility of military activities in outer space.³⁴ Accordingly, the Soviet Union adopted a firm stance at the outset, arguing that any surveillance of its territory (even from space) constituted illegal espionage. Therefore, at first, satellite reconnaissance was considered military in nature

³² GALLIFORD 2024.

³³ SORAGHAN 1967.

³⁴ SORAGHAN 1967.

and therefore 'non-peaceful', in violation of international law.³⁵ By contrast, U.S. and other Western officials argued that overflight by unarmed satellites was lawful and did not violate international law.³⁶ By the mid-1960s, the Soviets quietly stopped protesting reconnaissance satellites (perhaps realising they needed them too), and no government has ever applied the OST to forbid another's satellite imagery.³⁷

Other than that, Article IV of the OST prohibits only the deployment of nuclear weapons (and other weapons of mass destruction) into orbit or on celestial bodies,³⁸ but not cameras or sensors; this is understood because it does not ban conventional military satellites or reconnaissance systems.

Still, the legal interpretation is not without controversy. The OST does not explicitly extend its 'peaceful purposes' clause to Earth orbit, and some scholars argue that, if read strictly as 'non-military', even satellite reconnaissance would be unlawful. From this perspective, all military uses of space undermine global security and should be deemed non-peaceful.³⁹ Others counter that such a definition is overly restrictive and destabilising, noting that intelligence-gathering through surveillance satellites can actually foster stability by reducing uncertainty and the risk of miscalculation.⁴⁰ On balance, prevailing state practice and the UN record support the narrower interpretation: non-violent military activities, including reconnaissance, are tolerated under the OST. Importantly, no treaty expressly legalises reconnaissance satellites; their legitimacy instead rests on states' silence, tied to the aim behind their use, as this paper will later demonstrate with respect to states' consent and sovereignty. This legal silence on surveillance does not signal approval of spying; it means that states never negotiated a specific, binding norm prohibiting space-based espionage, and the law on this point remains ambiguous. We can say that although the OST does not ban spy satellites, their use raises distinct legal ambiguities because

³⁵ SORAGHAN 1967.

³⁶ SORAGHAN 1967.

³⁷ SORAGHAN 1967.

³⁸ GRUNERT 2021.

³⁹ SORAGHAN 1967.

⁴⁰ SORAGHAN 1967.

the treaty was drafted at a time when such capabilities were emerging and was not designed to regulate the intelligence functions of advanced space technology. The result is a regime in which space-based espionage is technically lawful because it is not expressly forbidden, but remains normatively and politically contested, and commentators highlight the tension between this silence and broader principles of public international law that emphasise sovereign equality, non-intervention and the need for responsible conduct. These general principles, while capable of informing a normative critique of aggressive surveillance activities, are not enforceable and are themselves too broad to serve as effective alternatives to a clear and binding rule on space espionage.

THE AMBIGUITY OF REGISTERING
RECONNAISSANCE SATELLITES UNDER
THE REGISTRATION CONVENTION

The Convention on Registration of Objects Launched into Outer Space serves an extremely important role within the legal framework surrounding the use of reconnaissance satellites. It is not about directly regulating spying but rather creating a process that establishes some level of transparency in the operation of space objects. In this sense, one may ask: Does the convention regulate the registration of reconnaissance satellites, or does it merely make them legally visible without revealing their operational function? The answer lies in the structure of the Registration Convention itself, which governs the existence and legal identification of satellites far more effectively than it regulates their strategic or intelligence purposes.⁴¹ In this regard, it should be recalled that the Registration Convention was developed as an elaboration of the Outer Space Treaty, particularly Article VIII, which establishes that the State of registry retains jurisdiction and control over its space objects. Although the Outer Space Treaty introduced this principle, it did not provide a specific procedural framework for registration. As a result,

⁴¹ JAKHU et al. 2018: 406–420.

the above-mentioned legal gap was closed by the Registration Convention, which requires the launching States to provide certain details, such as the launching State, launch date and place, orbit, and the function of the space object.⁴² At least in theory, this system was intended to strengthen transparency, reduce uncertainty in international relations, and support the peaceful use of outer space. But does this transparency extend to military reconnaissance activities in practice? With regard to reconnaissance satellites, the importance of registration in terms of law centres around attribution. In other words, while a spy satellite has a classified purpose, from a legal standpoint it cannot escape the launching State, which, under Article VI of the OST, is internationally responsible for the activity. Therefore, if a State like the U.S., Russia, or China launches a reconnaissance satellite used for intelligence purposes or in military strategies, international responsibility falls on the launching state.⁴³ However, it is vital to raise another question here: Does such a process regulate espionage? The answer is no. It ensures legal identification, not substantive control over intelligence operations. However, the transparency aims of the Treaty suffer from the vagueness associated with the notion of 'general function' prescribed by Article IV.⁴⁴ Why is this element a problem? Because it allows States to adhere to the requirement to register satellites, but at the same time, hide the actual nature of operations conducted by the satellites. In fact, States mainly do not mention satellites as being used for reconnaissance or surveillance. They prefer to describe them in broad terms as 'Earth observation', 'communication', 'scientific' satellites, or those with 'practical application'. The major disadvantage, however, is the vagueness of the notion of 'general function'.⁴⁵ The United States has registered its military satellites as 'practical application', including weather and communication satellites; the Soviet Union used scientific nomenclature for its satellites; China uses the term 'remote sensing' for its Yaogan satellites; and Russia uses generic

⁴² JAKHU et al. 2018: 406–420.

⁴³ JAKHU et al. 2018: 406–420.

⁴⁴ JAKHU et al. 2018: 406–420.

⁴⁵ JAKHU et al. 2018: 406–420.

information about tasks by the Ministry of Defence.⁴⁶ In turn, there have been instances in which France openly disclosed reconnaissance satellite Elisa as an electronic intelligence satellite (Microsatellite d'écoute).⁴⁷ All of these actions undermine the very purpose of this Convention as a means of promoting transparency, underscoring the drawbacks of the voluntary nature of the information exchange process. As a matter of fact, the role played by the Secretary-General of the UN is mostly secretarial, where the organisation simply registers the information presented but cannot check its validity or confront incorrect data.⁴⁸ This leads to a key issue: registration creates visibility without transparency. Spy satellites are acknowledged as existing objects, but their intelligence function remains obscured. In essence, the Registration Convention regulates the issue of attribution and not functionality. The Convention guarantees that reconnaissance satellites do not have anonymity; however, it does not limit their operational purposes.

*The non-relevance of the Moon Agreement in
the context of reconnaissance satellites*

Article 3 of the Moon Agreement⁴⁹ articulates its core normative stance: “The Moon shall be used by all States Parties exclusively for peaceful purposes.” It then prohibits “any threat or use of force or any other hostile act or threat of hostile act on the moon” and forbids the placing of weapons of mass destruction in orbit around or on the Moon, as well as the establishment of military bases, installations, or fortifications there.⁵⁰ These prohibitions clearly reflect the desire to prevent the militarisation and hostile exploitation of the Moon itself, a body that is increasingly attracting scientific and exploratory interest. However, the language of Article 3 is focused on activities on and in orbit of the Moon; it does not purport to govern activities occurring entirely

⁴⁶ JAKHU et al. 2018: 406–420.

⁴⁷ JAKHU et al. 2018: 406–420.

⁴⁸ JAKHU et al. 2018: 406–420.

⁴⁹ United Nations Office for Outer Space Affairs 1979.

⁵⁰ United Nations Office for Outer Space Affairs 1979.

in Earth orbit, such as the deployment of satellites for Earth observation or reconnaissance. A careful reading of this text reveals two fundamental limitations when applying the Moon Agreement to spy satellites. First, the geographical restriction is stated in the treaty: the obligations apply to “the Moon and other celestial bodies [...] except insofar as specific legal norms enter into force with respect to any of these celestial bodies”.⁵¹ By excluding Earth and focusing on orbits or trajectories related to the Moon itself, the treaty establishes a geographical limitation that clearly excludes the domain of terrestrial remote sensing. Second, the limitation in terms of the subject matter is also clearly stated in the treaty; the prohibited acts are those of conventional military character on the Moon, such as the hostile use of force, the stationing of weapons of mass destruction, and military manoeuvres on or around the lunar terrain, but not remote sensing on Earth by satellites in low or medium Earth orbits.

This understanding may be explained in the context of the conditions surrounding the treaty’s negotiation and its application in practice. Negotiation of the Moon Agreement is based on the need to achieve the treaty’s objectives: to avoid conflict in the exploitation of resources on the Moon, to promote international cooperation in their exploitation, and to maintain the Moon as a zone of peaceful scientific activities. The prohibition of military bases and the use of military weapons on the Moon, as set out in the Moon Agreement, reflects concerns about the presence of human beings and potential territorial entanglements on the Moon. There is no such discussion or provision for the collection of intelligence through the gathering of intelligence via Earth’s orbit. This makes the line drawn on surveillance and espionage more ambiguous. The Moon Agreement’s low ratification rate suggests it has lesser significance. This is unlike the OST, which has received almost universal ratification and serves as the foundation of international space law. Only a handful of countries have ratified the Moon Agreement, none of which are major players in the use of space for espionage.

⁵¹ United Nations Office for Outer Space Affairs 1979.

International Telecommunication Union

Moving to the specific regulation of satellites, a parallel body of law governs satellite communications (ITU and related rules), but it does not ban surveillance. The International Telecommunication Union allocates spectrum and orbital slots to prevent interference. Under the ITU Radio Regulations, states must avoid causing ‘harmful interference’ to others’ radio signals. Article 48 of the ITU Constitution also recognises a limited ‘military exception’, affirming that member states ‘retain their entire freedom about military radio installations’. However, this freedom is expressly conditioned by a duty to observe, as far as possible, the ITU measures designed to prevent harmful interference. Intentional jamming or cyberattack on another’s satellite signal would clearly violate these ITU interference rules.⁵² Indeed, analysts emphasise that, while no meaningful international remedy exists against such interference (other than possible self-defence), treaty law prohibits jamming.⁵³ By contrast, the interception of satellite signals (espionage and spying on non-public data) is not addressed by any international treaty. In practice, states assume that sensitive military communications will be interpreted. Thus, while intercepting a foreign military uplink may be seen as unfriendly, it is not regulated by the ITU and is not, *per se*, illegal under space law.

Another issue we can raise is that if a commercial company’s satellite is gathering information over Country X and selling it to Country Y’s military, could Country X request this information under the UN Remote Sensing Principles?⁵⁴ Theoretically, yes, but there is no way to implement it.⁵⁵ During the 1970s, proposals to register satellites and exchange images to avoid misinterpretation were made, but no such practice was ever implemented. Presently, nations store their high-resolution pictures confidentially as part of military intelligence. The 1975 Registration Convention requests states to register satellites they launch, but only in general terms. A satellite, for

⁵² KEIR 2021.

⁵³ KEIR 2021.

⁵⁴ United Nations General Assembly 1986.

⁵⁵ FRĄCKIEWICZ 2025.

example, can be registered as 'Earth observation' without mentioning that it is utilised for spying. Certain military satellites are even registered late or with minimal information.⁵⁶

SOVEREIGNTY AND SELF-DEFENCE WHEN USING RECONNAISSANCE SATELLITES

The use of reconnaissance satellites raises questions about sovereignty and privacy, since no state 'owns' space and is not subject to any nation's sovereignty, as stated in the 'non-appropriation' principle of the OST. For this reason, satellites routinely pass over other countries. Under international law, this overflight is not considered a violation of sovereignty, unlike an aircraft that enters another country's airspace without permission. The doctrine of 'province of mankind' (Article I of the OST) and related resolutions affirm that space is free and open.⁵⁷ This does not always imply that states do not seek to exercise some degree of control over foreign spy operations conducted at orbital altitudes over their borders. Satellite spying is regularly conducted from outer space over the territories of other states. Although such activity does not constitute a physical invasion of territorial sovereignty, it can nevertheless pose a tremendous threat to national security and confidentiality.⁵⁸

In other words, satellites gather data about people and militaries on Earth, raising privacy and security concerns, especially during wartime. High-resolution imagery can reveal crowd movements and even individual faces. Real-time surveillance (through motion-capture or signal interception) can intrude deeply into a state's information sphere. Some states view such intrusions as 'acts of espionage' or interference with sovereign rights. For example, when a Chinese balloon drifted over the U.S. in 2023, U.S. officials denounced it as a violation of sovereignty and international

⁵⁶ FRĄCKIEWICZ 2025.

⁵⁷ FANG et al. 2023.

⁵⁸ SORAGHAN 1967.

law.⁵⁹ The same logic could apply to satellites: if a satellite eavesdrops on military communications without consent, that is certainly uneasy for the target state's sovereignty.

On the other hand, the counterargument is that satellite surveillance is necessary for stability: no country should have complete secrecy over its military posture. Indeed, one rationale for OST reconnaissance exceptions was that an open society has the right to gather information that a closed society would hide.⁶⁰

Finally, states often justify space-based surveillance on security grounds. Under Article 51 of the UN Charter, states have an inherent right to self-defence, including the right to gather information for that purpose. Western nations have long argued that reconnaissance satellites are an essential non-violent component of defence (and arms control verification). The U.S. at the UN asserted that covertly collecting intelligence by 'purely passive' means is entirely consistent with the right of self-defence.⁶¹ From this perspective, reconnaissance satellites are similar to unfettered freedom of navigation; they enable early warning of threats, preventing war rather than provoking it. In sum, the duality in international law, with no express ban on espionage but strong sovereign rights, means that states invoking security needs can generally claim legitimacy for space spying as a sort of legitimate surveillance. Marking it as another grey zone in the legal context of space in general and satellites in particular.

RECONNAISSANCE SATELLITES AS A TARGET DURING WARFARE

Reconnaissance satellites are military assets, which raises the question of whether they can legally be targeted during war. According to international law, specifically the law of armed conflict (LOAC) or international humanitarian law, attacks may be directed only against military targets.

⁵⁹ FANG et al. 2023.

⁶⁰ SORAGHAN 1967.

⁶¹ SORAGHAN 1967.

Article 52(2) of the Additional Protocol I to the Geneva Conventions also defines military objectives as “those objects which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction [...] offers a definite military advantage”.⁶² Reconnaissance satellites are within this definition. They collect intelligence in support of military action and, for instance, positively assist it. On that account, they can lawfully be considered military targets and thus legitimate targets in war.⁶³

Although reconnaissance satellites can be made the target of military action, there are severe legal and ethical constraints on doing so. According to Article 35 of Additional Protocol I and customary IHL, attacks should not inflict excessive collateral harm or long-term, widespread, severe environmental effects. Destruction of the satellite typically generates orbital debris that damages civilian satellites and space infrastructure utilised by many states. It leaves one wondering if such attacks could ever be proportionate.⁶⁴

No treaty, however, exists that expressly prohibits anti-satellite (ASAT) attacks, yet new practice signals growing concern. In 2022, the United States issued a moratorium on ASAT testing that creates space debris, and some other states signed up to it to set a new global norm in this matter.⁶⁵

Finally, if commercial satellites provide intelligence or targeting data during a war, they might lose their civilian immunity and become military targets themselves. The International Committee of the Red Cross (ICRC) notes that civilian objects used for a military purpose may be attacked, yet only when they are being used for such ends.⁶⁶ This issue was evident in the Ukrainian war, where satellite imagery from private sources was reported to contribute to military action.⁶⁷

⁶² Protocol I 1977: Articles 35, 52.

⁶³ FRĄCKIEWICZ 2025.

⁶⁴ FRĄCKIEWICZ 2025.

⁶⁵ FRĄCKIEWICZ 2025.

⁶⁶ International Committee of the Red Cross 2005: Rules 1–10, 43–45.

⁶⁷ FRĄCKIEWICZ 2025.

CASE STUDIES IN USING RECONNAISSANCE
SATELLITES FOR INTELLIGENCE GATHERING

This section is mandatory to demonstrate how reconnaissance satellites were incorporated into modern warfare and to provide actual instances of their use in spying and intelligence gathering. In the face of the present shifting geopolitical landscape, it is also required to recognise that the deployment of force has extended beyond traditional wars. Terrorist activities, in my view, should be regarded as a form of warfare, in which we find non-governmental actors rather than states. Spy satellites have been used in counterterrorism operations, for which the case of Osama bin Laden will be discussed.

Reconnaissance satellites in conventional armed conflicts

The use of reconnaissance satellites in military wars is not a theory but a well-documented reality that has made up the bulk of contemporary warfare. From the Cold War to the latest conflicts, military spy satellites have played vital roles in intelligence gathering, guiding operations and informing political decision-making. One of the first and most dramatic was the Cuban Missile Crisis of 1962. At this time, U.S. reconnaissance satellites in the CORONA program⁶⁸ supplied photographic proof of Soviet nuclear missile bases in Cuba. The photographs, available only recently due to the success of America's first satellite spy system, provided unparalleled insight into Soviet behaviour.⁶⁹ The photos had a crucial role insofar as they offered irrefutable proof that the Soviet Union was deploying strategic weapons off the coast of the United States.⁷⁰ They had significant political and legal value, allowing the United States to present its case to the United Nations and defend the naval quarantine of Cuba in international law.⁷¹ Here, we can see that satellite intelligence did not just inform military decisions

⁶⁸ Central Intelligence Agency 1995.

⁶⁹ Central Intelligence Agency 1995.

⁷⁰ CADDELL 2016.

⁷¹ CADDELL 2016.

but also shaped the legal and diplomatic lexicon that ultimately averted a nuclear confrontation.⁷²

Two decades on, the 1990–1991 Gulf War was the first to see spy satellites fully deployed in combat.⁷³ The U.S. satellites delivered near-real-time intelligence on Iraqi military deployments, pinpoint missile targets, and the effectiveness of coalition bombing raids.⁷⁴ Space-based systems, such as GPS, enabled the precise targeting of Iraqi military assets.⁷⁵

The 2003 invasion of Iraq by the U.S. further demonstrated this trend. We cannot deny that satellites for reconnaissance provided high-resolution images of Iraqi infrastructure, military installations and possible weapons facilities.⁷⁶ This imagery, together with signals intelligence, was intended to disable Iraq's military command and control quickly. But the Iraq War also exhibited the controversial nature of satellite intelligence. The U.S. justification for the invasion included claims of weapons of mass destruction, supported in part by satellite imagery, which were later proven to be unconfirmed.⁷⁷ The most notable event was the presentation by the United States Secretary of State Colin Powell to the UN Security Council, where satellite images were used to argue that Iraq was concealing prohibited weapons.⁷⁸ Legally, this challenged the legitimacy of satellite evidence as a cause for the use of force, highlighting the clash between intelligence, political perception and international law.⁷⁹ Other conflicts, such as the recent Russian–Ukrainian War, further underscore the ongoing use of spy satellites for strategic reconnaissance and instant targeting, underscoring the need to clarify their legal status and states' responsibility.

⁷² CADDELL 2016.

⁷³ Central Intelligence Agency 2002.

⁷⁴ BALL 1991.

⁷⁵ CITINO 2012.

⁷⁶ Central Intelligence Agency 2002.

⁷⁷ Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction 2005.

⁷⁸ Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction 2005.

⁷⁹ Central Intelligence Agency 2002.

*Reconnaissance satellites in counterterrorism
operations: The Osama bin Laden case*

Following the 11 September 2001 attacks, the U.S. relied heavily on a combination of human efforts, signals intelligence and satellite imagery to track Osama bin Laden, the al-Qaeda leader, on 2 May 2011.⁸⁰ Spy satellites proved invaluable, especially after attention shifted to a suspicious compound in Abbottabad, Pakistan. High-definition photographs revealed peculiar security features, such as high walls, a lack of telephone or internet access, and controlled patterns of movement, leading the analysts to conclude that the compound must have been constructed to hide a high-value target.⁸¹ But satellite imaging could not guarantee bin Laden's presence inside; intelligence estimates given to President Obama before the raid varied at best between a 40–60% chance that he was there. Deciding to proceed with Operation Neptune Spear⁸² thus came with a compromise: to operate on high confidence instead of complete certainty, knowing that national security concerns overrode evidentiary shortcomings.

Legally, the operation was a violation of sovereignty, as Pakistan did not approve the invasion and loudly complained about it as an infringement of international law.⁸³ The proponents of the action, however, invoked the theory of self-defence under Article 51 of the UN Charter, as well as the 'unwilling or unable' test, to argue that the U.S. was justified in acting within another state's territory if the latter was unable to cope with threats emanating from its own territory.⁸⁴ The ethical and legal dimensions also encompassed proportionality, necessity, and whether it was permissible to kill rather than capture bin Laden.⁸⁵ Lastly, several factors compelled the choice since bin Laden's ongoing threat as al-Qaeda

⁸⁰ CLARK 2011.

⁸¹ WALSH 2011.

⁸² National September 11 Memorial & Museum s. a.

⁸³ DUNLAP 2019.

⁸⁴ DUNLAP 2019.

⁸⁵ DUNLAP 2019.

leader, years of accumulated intelligence on his couriers and compound structure, doubts about the validity of diplomatic or cooperative solutions with Pakistan, the operational practicability made possible by satellite and aerial surveillance, and political and moral obligations to deliver justice for 9/11.⁸⁶ Therefore, while the attack was an exemplary act of sovereignty breach, it also illustrated how reconnaissance satellites and covert espionage influenced sensitive decisions, in which legal justification and national security are intertwined.

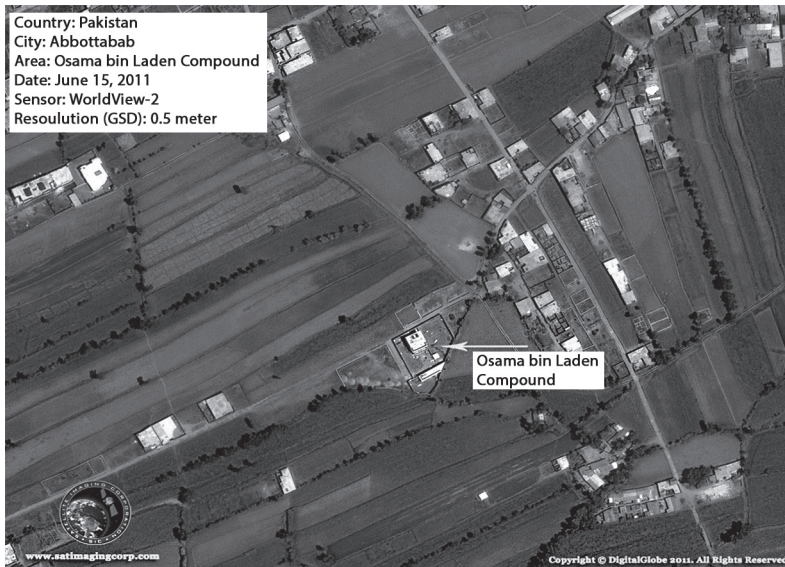


Figure 1. Image showing U.S. satellites spying on the Osama bin Laden compound for several months before they attacked him

Source: DigitalGlobe 2011.

⁸⁶ CLARK 2011.

ESPIONAGE AND THE DUAL-USE DILEMMA

*Distinguishing reconnaissance satellites from
civilian earth observation systems*

Compared with a civilian satellite, a spy satellite is different in both technology and law. They can use similar technologies, but they differ in purpose, operation and legal classification. As clearly mentioned in this paper, a spy or reconnaissance satellite is specifically designed to carry out military or intelligence-related goals. The spy or reconnaissance satellite may carry sophisticated equipment such as high-resolution optical sensors, multi-spectral or synthetic aperture radar (SAR) and signals intelligence (Sigint) equipment. The equipment may be capable of gathering accurate spatial, spectral and signal information. This information may include enemy military facilities, troop movements and signals. These capabilities distinguish them operationally from satellites designed for other purposes.⁸⁷

In contrast, civilian satellites are designed primarily to fulfil non-military missions, such as weather monitoring, environmental observation, communications, scientific research and public services. Earth observation satellites in this category collect imaging or sensor data targeted at environmental conditions (such as climate variables, forest cover, sea surface temperature) or cartographic and resource management purposes. Communications satellites relay radio signals to support television, internet and telephone services across broad geographic areas, and even military communications may rely on these civilian infrastructure satellites. However, there is a degree of technological convergence here, as many of these civilian satellites are equipped with high-powered sensors capable of generating intelligence-value imagery or data. Commercial Earth observation satellites can produce images of ground features with a level of detail approaching military-grade quality. This is referred to as dual-use technology, where the hardware can be used for both civilian and military purposes.⁸⁸

⁸⁷ Central Intelligence Agency s. a.

⁸⁸ MORIC 2022.

If we mentioned in the previous pages that reconnaissance satellites were legitimate targets in wars, since they are military objects, what about civilian satellites? The principle of distinction, as provided for in the IHL, requires the parties to distinguish between military objectives and civilian objects. In this respect, a civilian object shall be protected from attack if it does not meet the cumulative requirements provided for in the Additional Protocol I to the Geneva Conventions, which make an object a military objective.⁸⁹ These requirements include the object's contribution to the military action and its destruction, providing a definite military advantage in the conflict. However, it is also noteworthy that an object shall not be considered a military objective solely because it serves dual functions, both military and civilian. Instead, the focus should be on the mode in which the object has been used in the conflict.⁹⁰ For instance, the satellite should be available for civilian communications and broadcasting services and should be protected accordingly. However, if the satellite has been used in providing real-time imagery and command and control services to the military, it shall be qualified to become a target in the conflict.⁹¹

This assessment of use is particularly relevant whenever civilian satellites are used, directly or indirectly, for espionage or intelligence-gathering purposes. Espionage, as such, is not expressly regulated or prohibited under international space law, and space-based intelligence collection has long been tolerated under the legal logic of the freedom of use of outer space established by the OST, as stated in the previous section of this article. However, when intelligence activities conducted through civilian satellite systems become operationally integrated into military decision-making, the legal character of the satellite under IHL may be affected. A civilian satellite that provides data later analysed for strategic intelligence purposes does not automatically lose its civilian protection. By contrast, where a civilian Earth observation or communications satellite is used to supply real-time intelligence that directly supports military operations, such as targeting, operational planning, or command and control, it may be considered as

⁸⁹ Protocol I 1977: Articles 35, 52.

⁹⁰ FRĄCKIEWICZ 2025.

⁹¹ BERRANG 2023.

making an effective contribution to military action within the meaning of Article 52(2) of Additional Protocol I.⁹² In such circumstances, the intelligence function performed by the satellite moves beyond passive observation and enters the realm of operational military support, thereby engaging the legal framework applicable to military objectives.

The espionage dimension, therefore, sharpens, rather than replaces, the dual-use analysis. While international law does not prohibit intelligence-gathering from outer space per se, the decisive issue under IHL is whether the satellite's intelligence output is used to produce a concrete military advantage in an ongoing conflict.⁹³ As the International Committee of the Red Cross has noted, the determination of military objective status depends on the object's actual use at the relevant time, not on its civilian ownership or commercial character. This approach preserves the differentiation between general intelligence collection, which may be viewed as acceptable as a part of peacetime state practice, and operationally decisive forms of intelligence during war. In such circumstances, a presumption of civilian status remains, reinforcing the logic of IHL in modern data-driven warfare.

In addition, gathering information through civilian satellites creates difficulties in applying the principles of proportionality and precaution.⁹⁴ The espionage activities civilian satellites engage in rarely remain contained within the conflict between warring states, and disabling such satellites poses a threat to civilian services and even the risk of space debris. These foreseeable consequences must be taken into account when assessing the lawfulness of any attack. The espionage function of a satellite, therefore, does not automatically negate its civilian character. Still, it can, in specific circumstances, shift the legal balance toward targetability, subject constantly to the strict limits imposed by the IHL.

⁹² Protocol I 1977: Articles 35, 52.

⁹³ BERRANG 2023.

⁹⁴ BERRANG 2023.

The remote sensing principles and dual-use data

The Principles concerning Remote Sensing of the Earth from Outer Space, which were adopted by the United Nations General Assembly through Resolution 41/65 on 3 December 1986, were meant to address remote sensing of Earth for civilian purposes, including natural resource management, environmental protection and land use planning;⁹⁵ however, as mentioned previously, the same satellites used in such remote sensing can provide valuable military information, thus resulting in an overly broad normative regime that addresses civilian uses of remote sensing while completely ignoring the security implications. The issue becomes particularly apparent when considering dual-use technology.⁹⁶ The reconnaissance satellites used by the military and civilian remote sensing satellites are no longer similar technologies but rather the same technologies, collecting images with the same sensors at similar resolutions from similar altitudes in space, save for differences in the application of the collected information. It is this blurring of the line between civilian and military technology that the drafters of the Principles in 1986 never considered, and, thus, it is this blurring that makes the Principles relevant to espionage. The ambiguity in question originates with Principle I, which defines the remote sensing concept strictly in terms of civil development.⁹⁷ In essence, the Cold War era definition was chosen by the leading powers in space as a political concession, allowing them to exclude the reconnaissance programs of each other from international control. The resulting lack of a formal definition leaves no provision to distinguish civilian from military remote sensing, and the dual-use nature of such information makes the situation legally complicated. Indeed, it is collected within the procedures of a civil mission, but then can be analysed and used by intelligence agencies in reconnaissance roles. Principle XII adds an additional layer of complexity, in that it recognises a right of access by the sensed State to both primary and processed data

⁹⁵ United Nations General Assembly 1986.

⁹⁶ MORIC 2022.

⁹⁷ United Nations General Assembly 1986: Principle I.

related to its territory,⁹⁸ but does not grant it any veto over acquisition, any constraints on the third-party distribution of data, or, most importantly, any controls over the translation of the acquired imagery data into actionable intelligence, which is precisely where commercially obtained data would hold the most strategic value. The responsibility norm in Principle XIV, mirroring Article VI of the 1967 Outer Space Treaty, establishes that States bear international responsibility for all national remote sensing activities, whether governmental or private in character,⁹⁹ yet this provision lacks any enforcement architecture and any prohibition on militarisation of collected data, rendering it accountability without remedy. In the end, it is important to note that the principles of Remote Sensing from 1986 do not ban espionage but rather show how international law often governs the technological means of observation, neglecting its strategic uses. In reality, this helps create a situation in which dual-use remote sensing technologies can conduct espionage while still complying with international regulations, since their activities can be attributed to peaceful purposes. In terms of reconnaissance satellite research, it shows how espionage in outer space is no longer conducted via military satellites alone.

Private entity and the ownership of reconnaissance satellites

Historically, reconnaissance satellites were a top-secret tool owned mainly by the state; now, with the proliferation of space actors, they are also owned by private space companies, making this topic even more fragile. Companies like SpaceX now provide imagery, communication and navigation services to states. This has created legal issues regarding responsibility and control.¹⁰⁰ The OST addresses this under Article VI, which states that each state retains international responsibility for all national activities in outer space, both governmental and non-governmental. That means that

⁹⁸ United Nations General Assembly 1986: Principle XII.

⁹⁹ United Nations General Assembly 1986: Principle XIV.

¹⁰⁰ SHARMA 2025.

if a private satellite within U.S. jurisdiction misbehaves or injures someone, the U.S. is responsible.¹⁰¹

If Starlink is used for spying or espionage, or if its launch violates a treaty requirement, the U.S. could be held responsible by aggrieved states. In fact, SpaceX is even making spy satellites for U.S. national reconnaissance, indicating how blurred the boundaries between private and public space intelligence have become.¹⁰² The Ukraine conflict example is very concrete: the Ukrainian forces rely heavily on Starlink for communications, while Western firms provide high-resolution imagery and signals intelligence.¹⁰³ The U.S. Government effectively facilitates Ukraine's intelligence by controlling these private constellations.¹⁰⁴ Some have warned that this could create a form of collective responsibility. If any of these satellites were to break the rules, the U.S. could be implicated under OST Article VI. It also shows how civilian tech can be rapidly militarised.¹⁰⁵ The Atlantic Council notes that Western satellite coverage has given Ukraine a 'comparative advantage' on the battlefield, and that Russia considers those satellites a legitimate target under the laws of war.¹⁰⁶

CONCLUSION

Depending on the information provided, the following question can be addressed: In the context of modern warfare, what role do reconnaissance satellites play? We cannot provide a single specific response due to the nature of the act of spying itself. All the same, espionage practices remain controversial. Some have argued that space observation is inherently military, and that stricter restrictions are needed to uphold the peaceful-use principle. At the legal level, however, state practice has resolved the uncertainty in

¹⁰¹ SHARMA 2025.

¹⁰² ROULETTE-TAYLOR 2024.

¹⁰³ BURBACH 2022.

¹⁰⁴ BURBACH 2022.

¹⁰⁵ BURBACH 2022.

¹⁰⁶ BURBACH 2022.

favour of permissive interpretation. States regularly maintain that the 'peaceful purposes' article of the OST does not preclude non-violent military reconnaissance. All in all, there is no prohibition in a treaty against spy satellites; they are legal under international law if they do not carry banned weapons and do not engage in aggression themselves. It is dualism, no express prohibition but fear of sovereignty, that is the line most quoted by states in justification of space espionage. What makes it more complicated is when a civilian satellite is used in an espionage mission to gather intelligence for the military, highlighting the complex and challenging legal framework governing the dual use of these satellites. Finally, prevailing legal and normative trends strongly support the conclusion that satellite intelligence collection is legally acceptable under current space law, particularly when justified as defensive surveillance. Nevertheless, the normative dispute persists, with the question pending whether permissibility constitutes legitimacy.

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PART TWO:
LEGAL QUESTIONS OF THE INVOLVEMENT
OF NON-STATE ACTORS IN SPACE WARFARE

Mónika Ganczer

KNOW YOUR ENEMY: SPACE ACTIVITIES OF NON-GOVERNMENTAL ENTITIES IN INTERNATIONAL ARMED CONFLICTS

INTRODUCTION

In recent years, space activities have increasingly been carried out by non-governmental entities, and these activities have also arisen in connection with armed conflicts. In 2024, non-governmental entities, rather than states, accounted for more than three-quarters of the \$613 billion annual space economy.¹ At the time of the adoption of the major international treaties of space law, it had not been foreseen that the participation of non-governmental entities would be on such a scale, or that their participation in armed conflict would be a real problem. The 1990–1991 Gulf War raised the issue of space warfare, but the Russian–Ukrainian armed conflict that began in 2022 has proven that the involvement of non-state actors is now a reality, and the attribution of non-state actors’ activities to states must be examined. The aim of the study is to define when the activities of a non-governmental entity can be regarded as state activities. In other words, under what circumstances can we consider that a state is behind a non-state actor, and that its activities can be attributed to a state? Attribution should be used to analyse the international actions of states in armed conflict, including the assessment of the use of force, aggression, self-defence, influence or intervention in war, or neutrality. Therefore, the study focuses on the state which is internationally responsible for the space activities of non-governmental entities, paying special attention to situations involving armed conflicts. Attribution should be examined in the context

¹ See Space Foundation 2025.

of both space law and general international law, as its determination and assessment will differ in each context.

ATTRIBUTION OF SPACE ACTIVITIES OF NON- GOVERNMENTAL ENTITIES IN SPACE LAW

The examination of attribution in relation to the space activities of non-state actors may involve several states. It is necessary to analyse which states the non-governmental entities' actions can be attributed to, and under what conditions. The analysis must be carried out in relation to the following states: state of nationality of a non-governmental entity, state of registry of a non-governmental entity's space object, appropriate state of the non-governmental entity, and launching state of the space object of the non-governmental entity. It should be noted that there are occasions when the results of the assessment overlap and result in the same state. However, on other occasions, the results are different states.

State of nationality of a non-governmental entity

Non-governmental entities can be divided into two main categories: natural and juridical persons. The possibility of space activities being carried out by private individuals is unlikely to happen (it should be noted that this was once thought to be the case for non-governmental entities as a whole, and the space activities of juridical persons have superseded this idea). The nationality of natural persons is determined by the domestic legal rules on nationality of the state concerned, usually on the basis of the principles of *ius soli* or *ius sanguinis*, which are limited or restricted by the rules of international law on nationality in so far as the state concerned has undertaken international obligations.²

² GANCZER 2013: 58–63.

Juridical persons also have nationality due to their belonging to a state. In the Barcelona Traction case, the International Court of Justice stressed in 1970 that the nationality of a company is based on a 'close and permanent connection' with the State, and "the traditional rule attributes the right of diplomatic protection of a corporate entity to the State under the laws of which it is incorporated and in whose territory it has its registered office", and that these "two criteria have been confirmed by long practice and by numerous international instruments".³ The principle of registration/incorporation reflects customary international law, and as such, it was also included in the 2006 Draft Articles on Diplomatic Protection. Moreover, in this draft, nationality, for the purposes of diplomatic protection, means belonging to the state of incorporation. However, if the juridical person is controlled by nationals of another State or has no substantial business activity in the state of incorporation, and the seat of management and financial control is in another state, it will be regarded as a national of the latter state.⁴ In space law, however, the transnational nature of the activity requires the consideration of other nationality principles.⁵ UN General Assembly Resolution No. 68/74 includes, in the context of the nationality of juridical persons, the place of establishment, the place of registration and the seat on the territory as optional elements.⁶

In regulating the space activities of non-governmental entities, it is necessary to bear in mind that the nationality of a natural or a juridical person may be multiple or difficult to define. Dual or multiple nationality of natural persons may be more common nowadays, implying several states of nationality. In case of juridical persons, the State of registration and the State of incorporation may not be the same, or the State of incorporation may change over time, or the majority of investors may be nationals of

³ Case Concerning the Barcelona Traction. Light and Power Company, Limited (Belgium v. Spain), Second Phase, Judgment of 5 February 1970, I.C.J. Reports 1970, 42.

⁴ International Law Commission, Draft Articles on Diplomatic Protection, 2006, Article 9. HERCZEG 1968: 100–101.

⁶ Recommendations on national legislation relevant to the peaceful exploration and use of outer space, G.A. Res. 68/74, 11 December 2013, para. 2, 68 UN GAOR Suppl. No. 49 A/68/49 (Vol. I), 260, UN Doc. A/Res/68/74 (2013).

another State, or the company may be a transnational company, which may make it difficult to define its nationality. It is also possible that a given space activity is carried out jointly by natural and/or juridical persons of different nationalities.

State of registry of the space object of a non-governmental entity

The term ‘nationality’ refers not only to natural and juridical persons but also to ships, aircraft and space objects, which also means that they belong to a state. The practice of both air law and maritime law had already been established by the time space was first regulated, and served as a model for regulating the nationality of space objects. The nationality of space objects is that of their state of registry, i.e. the state which performs the registration.⁷ The purpose of registration is to ensure retention of ‘jurisdiction and control’ over the space object and its crew by the state of registry.⁸ Registration also designates the space object as a quasi-state territory of the state of registry, which may have particular relevance during armed conflicts.

The term ‘space object’ itself is defined in the treaties as “component parts of a space object as well as its launch vehicle and the parts thereof”,⁹ and the jurisprudential definition clarifies that this includes objects launched and intended to be launched into outer space.¹⁰ Several international documents stipulate that registration must be carried out by a launching

⁷ LOPEZ-GUTIERREZ 1966: 132–142. Registration Convention, Article II (2).

⁸ Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, G.A. Res. 1962, 13 December 1963, para. 7, 18 UN GAOR Suppl. No. 15 (A/5515), 15, UN Doc. A/Res/18/1962 (1963); Outer Space Treaty, Article VIII; Registration Convention, Article II (2); SCHMIDT-TEDD – SOUCEK 2020. The term “jurisdiction and control” is also used in the Moon Agreement, Article 12 (1).

⁹ Liability Convention, Article I (2) (d); Registration Convention, Article I (b).

¹⁰ HOBE et al. 2013: 504.

state,¹¹ a rule which has become part of customary international law.¹² Hence, a non-governmental entity cannot register its space object; the state of registry should be a launching state. The launching state itself means “(i) [a] [s]tate which launches or procures the launching of a space object; (ii) [a] [s]tate from whose territory or facility a space object is launched”.¹³ The state of registry is not necessarily the same as the owner of the space object, and it is therefore not identical to the owner, the owner state, or the non-governmental entity that is the owner and/or carries out the related space activities,¹⁴ and thus to any changes to these.¹⁵ The latter changes are only reported to the UN Secretary-General when ‘additional information’ is provided.¹⁶ In case of a single launching state, it is obvious that the registration will be carried out by that state, so the space object will be a national and parallelly a quasi-territory of that state. If the space object has more than one launching State, they must jointly determine which of them will register it, i.e. only one of them can register the space object. Thus, double registration – and double nationality, quasi-territory – is

¹¹ International Co-Operation in the Peaceful Uses of Outer Space, G.A. Res. 1721 B (XVI), 20 December 1961, para. B 1, 16 UN GAOR Suppl. No. 17 (A/5100), 6, UN Doc. A/AC.105/1154 (1961); Outer Space Treaty, Article VIII; Registration Convention, Article II (1).

¹² For more information see SCHMIDT-TEDD – SOUCEK 2020: 16.

¹³ Outer Space Treaty, Article VII; Liability Convention, Article I (c); Registration Convention, Article I (a). The definitions in the regulations are preceded by the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, G.A. Res. 1962, 13 December 1963, para. 8, 18 UN GAOR Suppl. No. 15 (A/5515), 15, UN Doc. A/Res/18/1962 (1963); Outer Space Treaty, Article VII.

¹⁴ Outer Space Treaty, Article VI. Recommendations on Enhancing the Practice of States and International Intergovernmental Organizations in Registering Space Objects, G.A. Res. 62/101, 17 December 2007, Recommendation 4, 62 UN GAOR Suppl. No. 49 A/62/49 (Vol. I), 161, UN Doc. A/Res/62/101 (2007).

¹⁵ AOKI 2020: 392–398.

¹⁶ Registration Convention, Article IV (2).

impossible.¹⁷ The registration can be transferred to another state, but the new registrant can only be another launching state.¹⁸ It is worth noting that for an international space station made up of several modules, the launching state of the given module is the state of registry. Under the terms of the relevant international treaty, the jurisdiction and control of the module is exercised by the state of registry, although the jurisdiction and control of the personnel is exercised by the state of nationality of each of the individual crewmembers.¹⁹

The importance and the method of registration were mentioned as early as in the UN General Assembly Resolution No. 1721 of 1961.²⁰ The 1974 Convention on Registration of Objects Launched into Outer Space required the launching State to establish an appropriate registry and to provide the Secretary-General of the United Nations with information specified in the Convention and inform them of any changes to that information.²¹ Accordingly, the United Nations Office for Outer Space Affairs maintain registrations under both the General Assembly resolution

¹⁷ Registration Convention, Article II (2). See also Recommendations on Enhancing the Practice of States and International Intergovernmental Organizations in Registering Space Objects, G.A. Res. 62/101, 17 December 2007, Recommendation 3.(b)–(c), 62 UN GAOR Suppl. No. 49 A/62/49 (Vol. I), 161, UN Doc. A/Res/62/101 (2007). Application of the concept of the “launching State”, G.A. Res. 59/115, 10 December 2004, para. 2, 59 UN GAOR Suppl. No. 49 A/59/49 (Vol. I), 163, UN Doc. A/Res/59/115 (2004).

¹⁸ HOBE et al. 2013: 256.

¹⁹ Agreement among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, Washington, 29 January 1998, Article 5.

²⁰ International Co-Operation in the Peaceful Uses of Outer Space, G.A. Res. 1721 B (XVI), 20 December 1961, para. B 1–2, 16 UN GAOR Suppl. No. 17 (A/5100), 6, UN Doc. A/AC.105/1154 (1961).

²¹ Registration Convention, Articles II–IV.

and the Registration Convention, in parallel.²² In addition, UN General Assembly Resolution No. 62/101, adopted in 2007, sets out detailed recommendations²³ and the resulting registration form, which has been in use since 2010,²⁴ has also been an important step forward in the process of data harmonisation.

The registration of space objects is becoming increasingly important because, in times of mass launches, space object registration is not always fully implemented. Only 87%²⁵ of the man-made objects in space are registered, which has several consequences, including issues of responsibility and liability, space traffic management, and space debris identification and mitigation. Space objects that are not registered possess no nationality and cannot be regarded as a quasi-territory of a state. Even the launching state cannot act as a state of nationality if it has not registered the space object. However, there is always a launching state of the space object, but it is more difficult to prove if registration is not completed. Even with proper registration, there may be disputes about the launching state if more than one state could be considered as a launching state. Furthermore, the appropriate state according to Article VI of the Outer Space Treaty is always responsible for the space activities of non-governmental entities, even if the space object is not registered. A clear and coherent registry would contribute to the identification of space objects and eliminate the situation of 'stateless' space objects.

²² Sulyok 2022: 97.

²³ Recommendations on Enhancing the Practice of States and International Intergovernmental Organizations in Registering Space Objects, G.A. Res. 62/101, 17 December 2007, 62 UN GAOR Suppl. No. 49 A/62/49 (Vol. I), 161, UN Doc. A/Res/62/101 (2007).

²⁴ See UNOOSA, Registration Information Submission Form (as at 1 January 2010). The current form is applicable from 2020.

²⁵ United Nations Office for Outer Space Affairs, United Nations Register of Objects Launched into Outer Space.

*National activities carried on by non-governmental entities
and the appropriate state of a non-governmental entity*

The first of the relevant documents to regulate space activities of non-governmental entities was UN General Assembly Resolution 1962 (XVIII),²⁶ the text of which was incorporated almost identically into the 1967 Outer Space Treaty. For the interpretation of 'national activities' in Article VI of the Outer Space Treaty, several possibilities should be considered. If we read Article VI as a whole, national activities can be used merely to distinguish it from *all activities . . . carried out by an international organisation*, listed in the third sentence.²⁷ A narrower meaning of national activity may be that of *activities carried out under the jurisdiction of a state*, which may include activities carried out within its territory under territorial jurisdiction, as well as activities carried out under personal jurisdiction by its nationals, regardless of them being within or outside its territory.²⁸ National activity, in an even narrower sense, may mean *activities carried out by nationals*, which may be linked to the fact that Article IX refers to space activities carried out by a state or its nationals, while mentioning potentially harmful interference with the activities of other states.²⁹ The broadest interpretation, that national activity means any activity not carried out by an international organisation, is problematic because it does not provide any guidance as to which state should be considered conducting a 'national activity' and would thus render the obligation meaningless. In today's space law, given the large number of non-governmental entities and their varying state identities,

²⁶ Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, G.A. Res. 1962, 13 December 1963, para. 5, 18 UN GAOR Suppl. No. 15 (A/5515), 15, UN Doc. A/Res/18/1962 (1963).

²⁷ HOBE et al. 2013: 390–391.

²⁸ BROWNLIE 1983: 165. Not jurisdiction, but a specific link to the state, or the direction or influence of the state is mentioned by CHENG 1998: 26; SILVESTROV 1991: 327–330; LEE 2005: 217.

²⁹ This interpretation is mentioned but disagreed with by BÖCKSTIEGEL 1991: 13; BÖCKSTIEGEL 1994: 77–78.

the best interpretation of national activity in the spirit of the drafters of the treaty and the principle of effectiveness³⁰ is to consider it an activity conducted under the jurisdiction of the state. This, however, needs to be further examined in the light of the analysis of the term ‘appropriate State’ in the second sentence.

In relation to the term ‘appropriate State’, it should be noted that UN General Assembly Resolution 1962 (XVIII) still used the term ‘State concerned’,³¹ which refers to the given state. The meaning of ‘appropriate State’ is more nuanced and may be interpreted as implying a particular quality of the state, carrying the connotation of the most adequate state for the given situation. There are many interpretations of the term ‘appropriate state’, and these sometimes overlap. These include 1. the elaboration of the state in the first sentence; 2. the registering state; 3. the launching state; 4. the owner of the space object; 5. the state of territorial jurisdiction; 6. the state of personal jurisdiction (state of nationality of a natural and juridical person); 7. a particular combination of these.³² All in all, the term ‘appropriate state’ should be interpreted as involving activities under the jurisdiction of the state, which includes its territorial, quasi-territorial and personal jurisdiction, including, where appropriate, the jurisdiction of the registering state after launch. This interpretation allows for the activities of a non-governmental entity to be backed in all cases by a state, which was the intention of the lawmaker.

³⁰ Vienna Convention, Articles 31(1), 31(4).

³¹ Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, G.A. Res. 1962, 13 December 1963, para. 5, 18 UN GAOR Suppl. No. 15 (A/5515), 15, UN Doc. A/Res/18/1962 (1963).

³² See SILVESTROV 1991: 327–330; BÖCKSTIEGEL 1991: 77–79; BÖCKSTIEGEL 1994: 13–15; ABHIJEET 2020: 363–365; HOBE et al. 2013: 396–403; CHENG 1998: 26–29; TATSUZAWA 1988: 344; LEE 2005: 218–219; VERESHCHETIN 1983: 263.

*Launching state of the space object of
a non-governmental entity*

The definition of the launching state has already been mentioned in the section on the state of registry of the space object of a non-governmental entity. The launching state itself means “(i) [a] [s]tate which launches or procures the launching of a space object; (ii) [a] [s]tate from whose territory or facility a space object is launched”.³³ Article VII of the Outer Space Treaty provides for the liability of launching states for damage caused by a space object. The whole Liability Convention also makes the launching state liable for all damage caused by the space object, i.e. the liability for the damage is always borne by the launching state.

In case of other high-risk activities outside space law, the operator is liable for damage, whereas in space law, the liability of the launching state has become general,³⁴ even if the space activity on the space object is conducted by a non-governmental entity. It should be noted that the liability of the launching state does not mean that the activities of a non-governmental entity on a space object constitute an act of the launching state in a legal sense. This issue is only about liability for damages caused by space objects.

Assessment: Attribution in space law

When it comes to assessing attribution, Article VI of the Outer Space Treaty serves as the fundamental point of reference. Under this Article, “international responsibility is the equivalent of attribution to the State of all its national activities in outer space”.³⁵

³³ Outer Space Treaty, Article VII; Liability Convention, Article I (c); Registration Convention, Article I (a). The definitions in the regulations are preceded by the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, G.A. Res. 1962, 13 December 1963, para. 8, 18 UN GAOR Suppl. No. 15 (A/5515), 15, UN Doc. A/Res/18/1962 (1963); Outer Space Treaty, Article VII.

³⁴ HERCZEG 1966: 90–91; KECSKÉS 2022: 130–133.

³⁵ MARCHISIO 2010: 3.

According to Article VI of the Outer Space Treaty:

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, 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. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.³⁶

Indeed, an important element of the first sentence is that the state is not only responsible for these activities, but must also ensure that they “are carried out in conformity with the provisions set forth in the present Treaty”.³⁷ It certainly includes Article III, stating that states “shall carry on activities in the exploration and use of outer space, [...] *in the interest of maintaining international peace and security* and promoting international co-operation and understanding”. Therefore, state parties are both internationally responsible and responsible for ensuring compliance with the obligations set forth in the Outer Space Treaty.

Article VI establishes the responsibility of states not only for their own activities but also for activities carried out by non-governmental entities in outer space. It should be noted that non-governmental entities include natural persons, juridical persons, universities and research institutes.³⁸ It is necessary to analyse whether their nationality or another characteristic constitutes the main criterion to define the responsible state for their activities. The *travaux préparatoires* indicate that the aim of the provision was to ensure

³⁶ Outer Space Treaty, Article VI.

³⁷ For more on this obligation see ABHIJEET 2020: 359–362.

³⁸ HOBE et al. 2013: 394.

that all non-state space activities remained under state responsibility.³⁹ To make certain that this is done effectively and that states do not evade their obligations, it is necessary to define the state of national activity of each specific space activity more precisely. Responsibility for a space activity and the implementation of the provisions of the treaty can only be ensured if the state concerned is involved in some way and is able to have an impact on the activity in question. This interpretation can therefore be accepted if the term 'the appropriate State Party' in the following sentence is taken to clarify the meaning of the national activity of non-governmental entities. Employing the narrowest interpretation of national activities of non-governmental entities and considering only the activities of nationals as national activities, the distribution of responsibility between states is relatively clear, except for the possible disputes over the determination of the nationality of juridical persons, as mentioned above. However, it may be the case that the responsible state is not the state which is best placed to supervise the activity in question, for example, in the case of multinational companies, foreign activities on the territory of the state, transfer of property, or joint activities by nationals of different states. As previously stated, the most accurate interpretation of national activity is to consider it an activity that is carried out under the jurisdiction of the state. Therefore, the nationality of the non-governmental entity is relevant in determining the state under which the entity is subject to personal jurisdiction. However, territorial jurisdiction remains of crucial importance when determining the appropriate state. This ensures that it is equally responsible for activities carried out on the territory and quasi-territory of the state, and for activities carried out by nationals (whether or not they are on the territory of the state). Other theories have also been proposed, namely the 'line segment theory' or 'proportionality theory',⁴⁰ but these have not yet been proven by international legal scholars or state practice. It is interesting to note that if a state has only a controlling interest in a company that is not a national of that state and does not operate within its territory, it will not be considered an appropriate state. In addition, the fact that a non-governmental entity is

³⁹ LACHS 1972: 122.

⁴⁰ WANG-HU 2025: 14–20.

controlled by a government does not automatically make it a state-owned entity. Nevertheless, the issue of controlling interest of a state may be relevant to general international law when determining the international responsibility of a state.

The primary wording of 'appropriate State' may be interpreted as suggesting that there can be only one appropriate state, but the interpretation of the possibility of there being more than one appropriate state has gained acceptance.⁴¹ The reality of space law today also requires this interpretation because of the complexity of space activities and the frequent occurrence of multiple state ownership. Article VI of the Outer Space Treaty requires "authorisation and continuing supervision by the appropriate State Party", so the meaning of 'appropriate state' needs to be understood in this context. The fundamental question concerns which state is in a position to authorise and continuously supervise space activities carried out by non-governmental entities. The state of registry exercises jurisdiction and control over the space object and over any personnel thereof,⁴² and this state can therefore be the appropriate state after launch (indeed, some argue that only the state of registry can be considered the appropriate state after launch).⁴³ It is important to note that registration of a space object designates that object as quasi-territory of the state of registry, which is relevant for any acts relating to the territory of that state. For example, the act of aggression may be perpetrated against a space object as a state territory, and conversely, from a space object as a state territory. Furthermore, aggression can be conducted by a space object as a state territory allowed to be used by another state for perpetrating an act of aggression against a third state. If the space object has a deck, it is to be considered a territorial space that can be used by persons. In the event of armed conflict, this area should be regarded as state territory.

The state under whose jurisdiction the non-governmental entity operates a space object will be the appropriate state, even if the launching state intentionally or unintentionally fails to register the space object. If a state fails to register a space object, it cannot claim exemption from responsibility if it

⁴¹ CHENG 1997: 609–610; CHENG 1998: 326, 328.

⁴² Outer Space Treaty, Article VIII.

⁴³ SILVESTROV 1991: 328.

is the appropriate state at the same time. However, the non-governmental entity operating the space object may not be under the jurisdiction of the state of registry, especially since it is not necessarily under its jurisdiction at the pre-launch stage. Similarly, if only the launching state is considered to be the appropriate state, some activities may remain uncontrolled, for example, if the launching state is only the state from whose territory the space object was launched, but the activity prior to the launching was not under its jurisdiction. If only the state with territorial jurisdiction were the 'appropriate state', that state would not be responsible for and would have no influence over the activities of its nationals if their activities were carried out in whole or in part outside its territory. Finally, if only the state of nationality was the 'appropriate state', activities carried out on its territory by a foreign national would be outside the scope of its effective control.

This also ensures that the state of nationality, the state of registry and the launching state may overlap, all of which can be considered the appropriate state if the activity is within their jurisdiction. Authorisation and continuing supervision can only be ensured by a state if its legal system can cover the activity concerned, for which the jurisdiction of the state is essential. A similar provision in the Moon Agreement and the UN General Assembly Resolution 68/74 is also worth recalling in this regard. The Moon Agreement is more precise than Article VI of the Outer Space Treaty, as Article 14(1) requires states parties to ensure that non-governmental entities 'under their jurisdiction' carry out activities under the authority and continuing supervision of the appropriate state. Similarly, this concept of jurisdiction is reinforced by paragraph 2 of UN General Assembly Resolution 68/74. In relation to the obligations of launching states and of states responsible for national activities, the Resolution specifies that states "should ascertain national jurisdiction over space activities carried out from territory under its jurisdiction and/or control; likewise, it should issue authorisations for and ensure supervision over space activities carried out elsewhere by its citizens and/or legal persons".⁴⁴

⁴⁴ Recommendations on national legislation relevant to the peaceful exploration and use of outer space, G.A. Res. 68/74, 11 December 2013, para. 2, 68 UN GAOR Suppl. No. 49 A/68/49 (Vol. I), 260, UN Doc. A/Res/68/74 (2013).

Neither the Outer Space Treaty nor the Moon Agreement contains an explicit and detailed definition of what exactly the obligation of authorisation and continuing supervision by the appropriate state involves. A state can therefore implement it in any way it chooses,⁴⁵ as long as it ensures appropriate authorisation and continuing supervision. In practice, this can be implemented either by adopting a domestic legal rule, by contracting with a non-governmental entity, or by means of an administrative act.⁴⁶ The practice of states shows that they are increasingly seeking to regulate the licensing of non-governmental entities and the implementation of continuing supervision in their domestic law through national space laws.⁴⁷ In the domestic legislation on this area adopted by more than 40 states today, it can be observed that there is still a lack of uniformity in practice as regards jurisdiction. While some states base their space law legislation on territorial jurisdiction only and others on personal jurisdiction only, in general, states tend to regulate space activities under both their territorial and personal jurisdiction.⁴⁸ A detailed recommendation regarding domestic regulation is contained in UN General Assembly Resolution 68/74, the adoption of which as customary international law would encourage domestic regulation to ensure more effective application of international law.⁴⁹ Actually, for the analysis of attribution, authorisation by a state may be indicative and facilitate the determination of the appropriate state. However, the authorisation procedure does not prove that a particular state is the appropriate state. This would lead to misunderstandings and wrong conclusions. It should be mentioned that the problem of the flag of convenience is familiar from the law of the sea. There are various reasons why ships may sail under the flag of another state, such as to benefit from that state's regulations or protection.

⁴⁵ Similar views are expressed by GÁL 2001: 62; VERESHCHETIN 1983: 263; VON DER DUNK 2019: 228; MASSON-ZWAAN 2008: 537.

⁴⁶ ABHIJEET 2020: 371.

⁴⁷ BARTÓKI-GÖNCZY 2022: 255; VON DER DUNK 2019: 228; MASSON-ZWAAN 2008: 537.

⁴⁸ LEE 2005: 221–224; VON DER DUNK 2019: 231–236.

⁴⁹ Recommendations on national legislation relevant to the peaceful exploration and use of outer space, G.A. Res. 68/74, 11 December 2013, paras. 2–8, 68 UN GAOR Suppl. No. 49 A/68/49 (Vol. I), 260, UN Doc. A/Res/68/74 (2013).

This problem is also known in space law. In certain states, there is a lack of national space law, or the domestic regulation of space law is deficient. Consequently, non-governmental entities seeking authorisation are not subject to independent due diligence checks regarding their technical representations and guarantees of safety and sustainable space activities. Conversely, if a non-governmental entity lacks authorisation, it cannot be concluded that there is no appropriate state. Authorisation is an obligation of the appropriate state, and the state becomes the appropriate state upon its jurisdiction over the entity, not upon its authorisation. If a state fails to fulfil this obligation, it cannot claim exemption from responsibility.

ATTRIBUTION OF SPACE ACTIVITIES OF NON-GOVERNMENTAL ENTITIES IN GENERAL INTERNATIONAL LAW

The characteristics of international responsibility are much clearer in general international law than in space law. Draft Articles of the International Law Commission on Responsibility of States for Internationally Wrongful Acts of 2001 (ARSIWA) defines internationally wrongful act of a state as follows: “When conduct consisting of an action or omission: (a) is attributable to the State under international law; and (b) constitutes a breach of an international obligation of the State.”⁵⁰ According to the Commentaries of ARSIWA, “the term ‘attribution’ is used to denote the operation of attaching a given action or omission to a State”.⁵¹ It is evident that the conducts of state bodies are attributable to the State.⁵² The conduct of non-governmental entities is considered an act of a State if it “is empowered by the law of that State

⁵⁰ International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts (hereinafter: ARSIWA), 2001, Article 2.

⁵¹ International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts, with Commentaries (hereinafter: ARSIWA with Commentaries), UN Doc. A/56/10, at 36 (2001).

⁵² ARSIWA, Article 4.

to exercise elements of the governmental authority”⁵³ or “if the person or group of persons is acting on the instructions of, or under the direction or control of, that State”.⁵⁴ Therefore, the requirements for attribution in general international law need a more defined control by a state than in space law. The jurisdiction of a state over a non-governmental entity is not sufficient, but control by a state is a necessary element in general international law. The level of control, namely the effective control required for attribution,⁵⁵ has also been formed in international law based on the Judgment of the International Court of Justice in the Case of Military and Paramilitary Activities in and against Nicaragua⁵⁶ and in the Case of Application of the Convention on the Prevention and Punishment of the Crime of Genocide.⁵⁷ The existence of effective control over a non-governmental entity by a state should be analysed on a case-by-case basis, with each situation assessed individually.

The application of international law is recognised in outer space under UN General Assembly Resolution No. 1721⁵⁸ and No. 1962,⁵⁹ and Article III of the Outer Space Treaty. Therefore, space law is not a self-contained regime, guidance is also provided by general international law.⁶⁰ Article 55 of the ARSIWA states: “These articles do not apply where and to the extent that the conditions for the existence of an internationally wrongful act or the content or implementation of the international responsibility of a State

⁵³ ARSIWA, Article 5.

⁵⁴ ARSIWA, Article 8.

⁵⁵ It should be noted that another, less accepted concept, overall control, can also be found in the case law of the International Criminal Court for the former Yugoslavia (ICTY). See *Prosecutor v. Duško Tadić*, 15 July 1995, ICTY Case No. IT-94-1-A, para. 405–406.

⁵⁶ *Military and Paramilitary Activities in and against Nicaragua* (Nicaragua v. United States of America), ICJ Reports 1986, 14, para. 115.

⁵⁷ *Application of the Convention on the Prevention and Punishment of the Crime of Genocide* (Bosnia and Herzegovina v. Serbia and Montenegro), ICJ Reports 2007, 43, para. 400.

⁵⁸ *International Co-operation in the Peaceful Uses of Outer Space*, G.A. Res. 1721, 16 UN GAOR Supp. No. 17 (A/5100), A, para. 1 (a).

⁵⁹ *Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space*, G.A. Res. 1962, 18 UN GAOR Supp. No. 15 (A/5515), para. 4.

⁶⁰ HOBE 2007: 42.

are governed by special rules of international law.” It means that space law is *lex specialis*, as a special responsibility regime, and that the customary law of state responsibility is *lex generalis*. Therefore, the rules of general international law on international responsibility must be consulted if space law cannot be applied.⁶¹

CONCLUSION

The state behind the actions of a non-governmental entity, i.e. the state to which the actions of this entity can be attributed, will be the appropriate state in an armed conflict. International responsibility for the activities of non-governmental entities is governed by Article VI of the Outer Space Treaty, where it should be emphasised that this term applies to both natural and juridical persons. The correct interpretation of the national activity and the appropriate state may be sufficient to ensure state responsibility for non-governmental entities in space law today. According to the proposed interpretation, the appropriate state is responsible for the activities of non-governmental entities within its territorial, quasi-territorial and personal jurisdiction, and thus for the activities of national natural and juridical persons within its personal jurisdiction. Nationality of non-governmental entities alone does not therefore establish attribution, but it is relevant in determining the appropriate state. On the one hand, there is a need to ensure that non-governmental entities carry out their activities in conformity with the provisions of the Treaty and on the other hand, there is a need to authorise and continuously supervise the space activities of non-governmental entities. It is important to note that while this authorisation procedure is an obligation of the appropriate state, it cannot be used to prove automatically that the state which gave the licence to the non-governmental entity is the appropriate state. It is conceivable that the appropriate state might fail to fulfil the authorisation obligation, or another state might

⁶¹ ARSIWA, Article 55; ARSIWA with Commentaries, 98.

authorise the space activity instead of the appropriate state, due to the flag of convenience problem. In fact, it is the jurisdiction of the state over the non-governmental entity that constitutes its appropriate state, rather than its authorisation. In summary, the term 'appropriate state' should be interpreted as referring to activities that fall under the jurisdiction of the state. This includes its territorial, quasi-territorial and personal jurisdiction, as well as, where relevant, the jurisdiction of the registering state after launch. The state of registry is always a launching state, and it might also be the appropriate state. It is evident that the registered space object becomes the quasi-territory of the state of registry, a fact which may hold particular relevance during armed conflicts. The launching state might be at the same time the appropriate state, but attribution is only linked to the appropriate state. It is important to note that the liability of the launching state does not mean that these activities can be considered an act of the launching state. The primary objective of the liability of the launching state is to ensure compensation by a state for the damage caused by a space object.

According to the ARSIWA, space law is *lex specialis* as a special responsibility regime and *derogat legi generali*, i.e. the rules of general international law on the international responsibility of states. Consequently, the rules of general international law on international responsibility should only be consulted if the application of space law is not possible. The requirement of effective control is stricter in general international law than the requirement of jurisdiction in space law. However, this leads to stricter responsibility under space law, since a weaker connection between the entity and the state is sufficient to establish responsibility. The main challenge with this concept is that sometimes more than one state should be regarded as an appropriate state in the new space era. This could potentially result in a scenario whereby these states seek to pass the responsibility onto each other. In this case, it is necessary to prove which state is the enemy and who is behind the activities of the non-state actor. The findings of the present study can assist in addressing these issues.

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THE PRINCIPLE OF STATE RESPONSIBILITY
FOR THE INVOLVEMENT OF PRIVATE
SPACE ACTORS IN MILITARY OPERATIONS

INTRODUCTION

The military development of the space domain is intensifying, leading to the conclusion that outer space has become indispensable to military operations. This militarisation is intensifying, especially as the number of actors involved increases.¹ In this regard, the war in Ukraine provides a significant illustration of the consequences of these developments. That conflict followed the annexation of Crimea on 20 February 2014, which marked the outset of a dispute and the crystallisation of tensions whose intensity escalated dramatically with Russia's invasion of Ukraine on 24 February 2022, giving rise to an international armed conflict between the two States. It is not the purpose of this article to dwell on the legal characterisation of the situation or on the stakes and consequences of that conflict under public international law. It is nevertheless important to note that the Russian actions of February 2014 constitute a breach of public international law by virtue of the violation of Ukraine's territorial integrity. Likewise, it is now indisputable that the situation qualifies as an international armed conflict, with the result that the law of armed conflict and its attendant rules – whether treaty-based or customary – must apply and, above all, be respected.

Within this conflict, one notable feature is the significant involvement of private commercial companies providing space services (imagery, connectivity, etc.).² This observation is not entirely new; what is striking, however,

¹ PONCET 2025; VERNILE 2018: 121.

² DENNERLEY–POZZA 2025: 324.

is the scale of the services supplied. Equally noteworthy is the extent to which these private firms can wield disruptive capabilities. Among the actors variously implicated in the Russo–Ukrainian conflict are private operators of space activities.³ Two companies have been particularly prominent: Maxar Technologies and Starlink Services LLC, a subsidiary of SpaceX. Maxar Technologies, formed after the 2017 merger of DigitalGlobe and MDA,⁴ is a well-established space operator. Maxar’s principal contribution in the context of the Russo–Ukrainian conflict has been the provision of Earth observation imagery to Kiev; it was notably through such imagery that the Russian invasion was publicly documented.⁵ The images supplied by Maxar constitute essential, first-rate geospatial intelligence of fundamental importance, enabling Ukraine to monitor conditions on its territory in near real time. Complementing the services provided by Maxar, SpaceX – through its Starlink satellite constellation – has contributed to providing high-speed internet coverage. Starlink services were solicited during the war in Ukraine so that Ukrainian forces and the civilian population could benefit from the high-speed internet connectivity offered by the operator.

What is particularly noteworthy is the relationship between these private companies and the State. In public international law, one issue that arises in a dispute involving private actors is the potential attribution of responsibility to the State, particularly for the conduct of private entities. This question is especially pertinent in the present case study. With respect to the two companies mentioned above, there can be no doubt that they maintain a clear and undeniable nexus with the United States of America. Starlink, as a subsidiary of SpaceX, is linked to its parent company, which is established in the United States, where its headquarters are located,

³ DAVENPORT 2022.

⁴ News Desk 2017. For practical reasons, the name Maxar will be used in this article to encompass all activities, regardless of changes in name. Moreover, it should be noted that Maxar Technologies has also undergone a further change, renaming these two subsidiaries: Maxar Intelligence will now be known as Vantor and Maxar Space Systems as Lanteris (ERWIN–RAINBOW 2025).

⁵ ERWIN 2022.

facilitating identification of a connection between the U.S. and the private operator. The same applies to Maxar, whose registered office likewise remains in the United States. Moreover, both companies are subject to U.S. law and, in the event of litigation, submit to its jurisdiction. Authorisation requests and other procedural steps necessary for the relevant space activities are, in practice, addressed primarily to U.S. institutions and agencies, notably the Federal Communications Commission. These elements are essential for what follows, since they lay the initial groundwork for the exercise of U.S. jurisdiction over these entities.

If the activities carried out by these companies and the data they produce are essential and confirm the undeniable militarisation of outer space, this raises questions about the influence that such private actors may exert on the ‘course of the war’ and, more broadly, on international relations.⁶

The analysis in this article will focus on international responsibility and the possibility of holding States accountable under public international law for the conduct of private actors. The question of State responsibility for the conduct of private actors supplying satellite data essential to one party to a conflict originates in the Russo–Ukrainian conflict. In that context, the two private companies mentioned above, Maxar and SpaceX, were responsible for such actions. The two situations are relatively different: in Maxar’s case, there was an actual suspension of service, whereas SpaceX merely threatened to suspend Starlink services.⁷ To date, SpaceX has not taken any effective action regarding Starlink services. By contrast, Maxar’s service suspension was implemented following an order from the U.S. Government. Yet one question remains: Can a State be held responsible for the suspension of space services provided by a private actor?

⁶ Some information led to think that the cessation of intelligence sharing led to the death of four peoples. Such information needs to be taken with care as it is not completely certain (MELKOZEROVA 2025).

⁷ ZENGERLE 2025; ERWIN 2025; ROULETTE et al. 2025.

THE GROWING PLACE OF PRIVATE ACTORS IN THE SPACE SECTOR

The reflections undertaken begin from the growing prominence of private companies in the space sector and, consequently, from the expansion of the services they provide. These actors, predominantly commercial, pursue objectives that clearly differ from those of national space agencies or other governmental actors. Moreover, the rise of such private participants in space activities has led to market-dominant firms. The case of SpaceX is particularly illustrative in this regard. The market share captured by the American company – supported mainly by public subsidies – has enabled it to establish itself as an indispensable actor in launch services. The company's expansion is mirrored in the field of connectivity through its subsidiary Starlink. The substantial development of the latter marks a genuine transformation in the satellite internet access sector. The facilitated and widely accessible deployment of Starlink satellites and the corresponding network has enabled the company to provide internet connectivity to an ever-increasing number of users. Although this contribution does not address the ethical implications of such deployment, it raises critical strategic questions.

One of the major issues concerns the influence exerted by these private actors, both within the space sector and, more broadly, in international relations. The expansion of their capabilities enhances their capacity for action and raises significant questions. Moreover, although these actors remain formally attached to a specific State, their development also contributes to the emergence of State actors whose power is amplified through the growth of national private companies. Dependence on these State actors, particularly due to the influence of their domestic private sector, creates a clear distinction among the many entities involved in space activities. Furthermore, the existence of space powers benefiting from such development and influence generates and reinforces dependence on these dominant actors. These considerations are far from anecdotal, especially as the concepts of strategic autonomy and autonomous access to technologies re-emerge in current debates. They reflect broader inequalities among

States, with consequences that are often difficult to assess yet particularly problematic.

A private actor engaged in space activities is invariably dependent on a particular State and, in most cases, maintains financial and legal ties to that State. This dependence may be economic or procedural in nature. Consequently, space operators must navigate a dual layer of legal regulation irrespective of their status: domestic law and international space law. The domestic layer governs matters such as authorisations and licences, access to launch facilities, procurement, frequency allocation and management. The proliferation of national space agencies attests to the expansion of space activities, yet national regulatory frameworks must be read alongside international space law. Many principles of international space law have direct implications for domestic regimes, and compliance with both levels of law is therefore essential. International space law also enshrines the principle that States bear responsibility for the activities of their space actors, whether governmental or non-governmental. This principle underscores the need for robust, coherent national space legislation to ensure the safety and security of space operations, regulate private operators, and protect the interests of the State.

At the same time, the distribution of space capabilities among actors remains highly unequal. Even among States, some possess autonomous capabilities to access and operate in space, while others are still developing such capacities. Among spacefaring nations, the disparities are pronounced: some States merely host a space agency and rely on foreign actors to build and launch satellites, whereas others control the entire lifecycle of space systems. Several States lack any national space agency and depend entirely on external providers for launch and operational services. This asymmetry creates dependencies between States – spacefaring and non-spacefaring alike – which, while legally permissible and common in domains requiring specialised expertise and substantial investment, produce an imbalance of power in the space domain. That imbalance becomes particularly problematic as private actors assume an increasing role in military-relevant space activities.

Recent events have underscored the urgency of addressing these issues, prompting some States to pursue indigenous capabilities to avoid strategic dependence on others.

LAUNCHING STATE, REGISTRATION STATE OR APPROPRIATE ONE?

The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space (the Outer Space Treaty) establishes numerous principles and distinguishes a variety of State categories that may be implicated: the launching State, the State of registry and the appropriate State. Each category is associated with a specific set of rights and obligations. Within the 1967 Outer Space Treaty, Articles VI, VII and VIII are primarily relevant. Article VI provides for the responsibility of the appropriate State through a regime of authorisation and continuing supervision. Consequently, the appropriate State is responsible for all space activities carried out in outer space, whether undertaken by governmental or non-governmental entities, in Earth orbit or on celestial bodies. This means that all private and commercial space activities may engage the responsibility of the State under whose jurisdiction they operate. It is worth quoting Michelle D. Hanlon when she stated that: “In short, Article VI of the Outer Space Treaty goes beyond the standard of national ‘due diligence’ and makes States directly responsible for all private activities in space.”⁸ That State must therefore ensure that national entities conducting space activities comply with certain international standards, notably by establishing specific national authorisation procedures.

⁸ HANLON 2024: 236.

Article VII, for its part, establishes liability on the part of the launching State in case of damage.⁹ The notion of “launching State” therefore encompasses four possible categories, which may be cumulative, as clarified by both the 1972 Convention on International Liability for Damage Caused by Space Objects (Liability Convention) and the Convention on Registration of Objects Launched into Outer Space (Registration Convention):

The term ‘launching State’ refers to:

- (i) A State which launches or procures the launching of a space object;
- (ii) A state from whose territory or facility a space object is launched.¹⁰

The existence of these alternative scenarios implies that several different States may be regarded as a launching State. In such cases, the Liability Convention provides for the possibility of joint and several liability, which may be established in advance.¹¹

Complementarily, Article VIII of the Outer Space Treaty provides that the State of registry retains jurisdiction over and control of the space object in question.¹² Unlike the launching State, where multiple States may concurrently be held responsible, there can be only one State of registry,

⁹ “Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air or in outer space, including the Moon and other celestial bodies” Outer Space Treaty, Article VII.

¹⁰ Liability Convention, Article I; Registration Convention, Article I (our highlighting).

¹¹ Liability Convention Article V.

¹² “A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return” Outer Space Treaty, Article VIII.

as specified in Article II (2) of the Registration Convention.¹³ In case of the State of registry, it is noteworthy that the exercise of jurisdiction and control is taken into consideration and therefore contributes to establishing a preferential link with the State, including from a legal standpoint. These elements may be understood as echoing the general regime of responsibility, which will be addressed in subsequent sections.

In sum, Articles VI, VII and VIII of the Outer Space Treaty, as clarified by subsequent instruments of space law, set out the general regime and highlight the principal duties and obligations incumbent upon States. Article VI focuses on responsibility by imposing an obligation of authorisation and continuing supervision on the appropriate State. Article VII addresses liability by making the launching State, or States, responsible in the event of damage. Article VIII establishes the obligation of the State of registry to retain jurisdiction and control over space objects. Although these obligations are relatively comprehensive and contribute to providing State coverage for actors engaged in space activities, the interplay among the notions of appropriate State, State of registry and launching State can at times be cumbersome.

INTERNATIONAL RESPONSIBILITY: GENERALIS VS. SPECIALIS

It should be stated at the outset that this analysis is conducted from the perspective of public international law and State responsibility and therefore excludes any consideration of liability. This article addresses the responsibility of States, not their liability. Although doctrinal developments have frequently conflated these two concepts, they remain distinct, and their conflation can generate confusion, as demonstrated by von der Dunk.¹⁴ Accordingly, this study excludes liability as understood under Article VII of

¹³ Registration Convention, Article II.

¹⁴ VON DER DUNK 1992: 363–371; CHENG 1997: 598–620; ALVARENGA DOS SANTOS 2020: 225–255.

the Outer Space Treaty¹⁵ and under the Liability Convention. Liability arises when damage occurs and concerns the consequences of that damage; by contrast, responsibility pertains to the breach of an international obligation and focuses on the wrongful act itself.¹⁶ Thus, the present inquiry is confined to responsibility as conceived in both general international law and space law, and as reflected in the International Law Commission Draft Articles on the Responsibility of States for Internationally Wrongful Acts.¹⁷ Under space law, and in particular Article VI of the Outer Space Treaty, responsibility entails an obligation on States to ensure that national space activities are conducted in conformity with applicable rules.¹⁸ This obligation requires the appropriate State to establish authorisation and continuing supervision over the activities of its governmental and non-governmental entities. Accordingly, the focus on responsibility rather than on liability is also justified by the fact that a breach of an international obligation does not necessarily give rise to damage, a condition without which liability, properly understood, cannot exist.

In the law of responsibility, it is necessary to distinguish between two categories of obligations: so-called primary obligations and secondary obligations.¹⁹ Primary obligations prescribe the conduct required of the State; they are generally obligations to act or to refrain from acting. These

¹⁵ Outer Space Treaty, Article VII.

¹⁶ VON DER DUNK 1992: 363–371. For a more detailed study on the law of international responsibility see CRAWFORD et al. 2010; KOLB 2017; BESSON 2022.

¹⁷ International Law Commission 2001.

¹⁸ “States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, 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. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization” Outer Space Treaty, Article VI.

¹⁹ COMBACAU–ALLAND 1985: 81–109.

obligations are found across the instruments of public international law, whether general or special, treaty-based or customary. It is by assessing the act in question against the relevant primary obligation that the legality of the act will be determined.²⁰ When a primary obligation is breached, secondary obligations come into play, setting out the duties that flow from that breach. As Robert Kolb observes: “Primary rules are all the substantive and procedural rules of international law whose breach gives rise to responsibility. Secondary rules encompass all the new obligations or faculties which flow as consequences from the unlawful act.”²¹ The primary obligation may be contained in a variety of instruments and norms. It is therefore appropriate to invoke the maxim *lex specialis derogat legi generali*, according to which the special rule prevails over the general. In seeking to establish State responsibility for the actions of private actors supplying satellite data, space law must be treated as *lex specialis*.

Although the question persists whether space law should be regarded as *lex specialis* or as a self-contained legal regime,²² Article III of the Outer Space Treaty is a principal basis for treating space law as *lex specialis*. This view has been advanced by scholars such as Gennady Zhukov²³ and, more recently, Stephan Hobe.²⁴ Beyond merely requiring compliance with international law, Article III establishes the applicability of general public international law to space activities and, conversely, permits its application where space law is silent. The continued relevance of general international law is further evidenced by other provisions of the space law corpus, notably those governing liability. At the same time, certain space-specific rules constitute exceptions to general international law.

²⁰ There is debate as to whether it is possible to establish, in general terms, that an act is contrary to international law. On this point, see in particular ANZILOTTI 1929: 495; CRAWFORD 2003: 26; DE VAUCLEROY 2025: 35.

²¹ KOLB 2017: 7.

²² JOHNSON 2020: 127–160; HOBE 2023: 51–56; MARCOFF 1973: 5–7.

²³ “[L]e droit spatial international est considéré comme une branche du droit international général, avec les sources du droit et les sujets identiques” ZHUKOV 1978: 240.

²⁴ HOBE 2023: 53–54.

Article VI of the Outer Space Treaty, for example, effects an automatic attribution to the 'appropriate' State and thus manifests a special rule in this field. Stephan Hobe has pointed to Article IX of the Outer Space Treaty as an illustration of an inadequate provision that ought to be supplemented by international environmental law; Article IX envisages consultations where there is doubt about environmental harm caused by outer space activities, yet this specific consultation mechanism has never been implemented. The failure to operationalise that mechanism reflects both a lack of political will among States and the mechanism's structural shortcomings, which suggest the need to reinforce it with existing norms of public international law. For these reasons, space law is best understood as a branch of public international law that, while drawing on general principles, possesses distinct characteristics requiring specific adaptations. Manfred Lachs emphasised the need to develop particular adaptations to space law and the space sector when he stated that "[i]n fact the extension of international law to outer space and celestial bodies is only a first step, forming a basis for further development, the creation of special and specific rules which already have or will become necessary in the future".²⁵

The demonstration that space law functions as *lex specialis* must be understood in conjunction with the characterisation of the law of international responsibility as *lex generalis*. The latter provides the general rules applicable when State responsibility is at issue. Once that relationship is established, attention must return to the specific obligation whose breach could give rise to State responsibility. Considering the focus of this inquiry, it is therefore necessary to examine whether such an obligation exists within space law. In case of a suspension of service ordered by a government, the question about neutrality or, in another sense, indirect participation in hostilities could be raised. In any case, one of the duties of the appropriate State is to

²⁵ LACHS 1972: 15.

ensure that the conduct of actors under its own responsibility is compliant with the applicable international law.²⁶

However, it is sometimes held that, in the law of international responsibility, the initial step consists in establishing attribution of conduct even before determining whether that conduct constitutes a breach of an international obligation. Clearly, without attribution, it is impossible to engage international responsibility. For the purposes of the present analysis – since attention is focused on the hypothesis arising from Article VI of the 1967 Outer Space Treaty – one must rely on the premises already established: space law functions as *lex specialis*. It follows that the rules of space law govern the situation. In this respect, the derogatory regime of space law is particularly noteworthy, as it provides a mechanism that effectively extends State coverage to all activities undertaken by private actors. Consequently, unlike the difficulties that may arise under general international law when attributing conduct to a State, attribution here presents no conceptual obstacle, because the obligation falls directly on the State for activities carried out by its private entities. This mechanism operates as a State coverage, facilitating straightforward attribution to the State. It should be emphasised, however, that the conduct imputable to the State is confined to the duties envisaged by Article VI: the State is attributed the obligation to ensure that the private entity complies with the Treaty's provisions and to maintain a regime of authorisation and continuing supervision over the entity's activities. That conclusion does not preclude the State, under its domestic law, from pursuing a right of recourse against the private company concerned.²⁷ However, the State of registry, mentioned

²⁶ While it is out of the scope of our study, in the Starlink and Maxar hypothesis, the protection of civilians could easily be solicited, particularly, but not exclusively, in accordance with Article 51 of Protocol I additional to the Geneva Conventions. Protocol Additional to the Geneva Conventions and relating to the Protection of Victims of International Armed Conflicts (Protocol I), Article 51.

²⁷ Such provision already exists under various national laws, see for example Article 11, Authorization of Space Activities and the Establishment of a National Space Registry (Austrian Outer Space Act 2011); Article 15(1), Belgian Law of 17 September 2005 on the Activities of Launching, Flight Operation or Guidance of Space Objects; Article 10(3), Cypriot Space Law of 2023 [93(I) 2023]; Part 6, Danish Outer Space Act 2016; Article

in Article VIII, referring to the obligations of jurisdiction and control, could serve as an indicator to find the appropriate State responsible allowing to facilitate the attribution.²⁸

AN ANNOYING LEGACY FROM THE PAST?

The question regarding the derogating regime of attribution of space law is not out of interest. On the contrary, as it facilitates an attribution to States, it is necessary to question whether the regime is still relevant or just an untouched heritage. The current regulatory regime applicable to private enterprises conducting activities in outer space is the legacy of a significant debate between American and Soviet representatives.²⁹ Initially, the parties were divided over whether non-governmental actors should be permitted to undertake space activities: the United States advocated in favour, while the Soviet Union opposed any such involvement. Through negotiation a compromise emerged, embodied in Article VI of the 1967 Outer Space Treaty, which establishes a regime of authorisation and continuing supervision for activities undertaken by non-governmental entities, including private companies.

By opening the door to private actors, the treaty's negotiators likely did not foresee the contemporary scale and complexity of commercial space activities. The gaps in space law, particularly with respect to private operators, are largely attributable to the inherently reactive character of legal development. Had the Soviet position prevailed and private space activities been prohibited, questions of State responsibility for those activities would not have arisen. Yet the present regime is among the most protective for private operators and for all participants in space activities. By providing,

14, French Space Act 2008; Article 11(2), Greek Law 4508/2017; Article 18, Portuguese Decree Law n°16 2019, of 22 January 2019; Article 16(4) Slovenian Space Activities Act 2022.

²⁸ MARCHISIO 2010.

²⁹ HOBE et al. 2009: 104–106; VON DER DUNK 2011: 3–28; VERNILE 2018; ÇAKIR 2019: 377; HANLON 2024.

as a general rule, for State responsibility for actions undertaken by non-governmental actors, the Outer Space Treaty creates a form of State coverage that constitutes an exception within general public international law. Whereas, under general international responsibility law, it is necessary to demonstrate a link of affiliation between a private actor and the State in order to attribute responsibility, that link is effectively presumed under space law. This ease of attribution is, however, tempered by the multiplicity of concepts that determine which State is to be engaged (e.g. State of registry, launching State, appropriate State). Attribution of responsibility is, therefore, in certain respects, simplified, and the possibility of establishing joint responsibility can facilitate legal analysis. Responsibility attaches to the State for two reasons: first, by virtue of the treaty regime itself; and second, because national authorities must be engaged to authorise and enable a private actor to conduct space activities. In effect, the State functions as the guardian of private actors not yet deemed capable of operating in space without oversight. Although a private actor may, in practice, undertake measures without prior consultation with the appropriate State, the State retains the power to suspend authorisations and to take the measures necessary to restore legality. Private actions are thus always subject to, at least tacit, State authorisation, and the State preserves remedial powers in case of disagreement. The regulatory dynamic therefore operates on two levels – international and domestic law: the former lacks coercive enforcement, while the latter possesses such powers. States thus have, at least under domestic law, the instruments required to ensure compliance by their private enterprises. The enduring question remains whether capacity translates into will; contemporary international relations demonstrate that some States disregard international rules and act solely in pursuit of power. The problem, therefore, lies less in the legal rules themselves than in their implementation by human actors.

CONCLUSION

In conclusion, it is clear that the attribution regime established by space law tends to facilitate the engagement of State responsibility. States bear a fundamental obligation in the context of space activities: ensuring that the entities for which they are accountable comply with the law. Consequently, if a private company acts in a manner that appears contrary to international law, the State may, in principle, incur responsibility. Since the State must exercise continuous supervision over entities conducting space activities, it is the breach of this supervisory obligation that could be invoked to justify the State's responsibility. A private actor's failure to comply with international law would therefore implicate the relevant State, as the latter would have failed to fulfil its duty of oversight. However, the absence of precedent hinders a comprehensive understanding of the mechanisms at stake and of the practical effectiveness of the State's supervisory duty in such scenarios.

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PART THREE:
STRATEGIC CONSIDERATIONS
FOR NATO AND THE EU

András Edl

USAGE OF ANTI-SATELLITE WEAPONS: THE PSYCHOLOGICAL ASPECTS

INTRODUCTION

This study is based on repeated observation. Occasionally in written texts, but more often in informal conversations, an opinion emerges that goes beyond mere optimism. This opinion asserts that the use of kinetic ASAT weapons by any state is highly unlikely or will never occur.

The dismissal of the possibility of kinetic ASAT use typically relies on one of two rationales at its core. The first centres on the resulting debris field from deploying such a weapon. As a cautionary example, proponents often cite the 2007 Chinese ASAT test, which created thousands of debris pieces, many of which remain in orbit due to the relatively high altitude of the defunct target satellite. This warning is frequently linked to the Kessler Syndrome. This forecasts a chain reaction in which debris collides with satellites, causing them to break apart into thousands of additional debris pieces. These, in turn, strike more satellites, continuing the cascade until assets in certain orbits are destroyed and humanity is effectively confined to Earth, making access to space impossible. The resulting catastrophe, losing valuable space assets integrated into critical infrastructure and the confinement of humanity to Earth is considered such a high cost that these stakeholders often compare large-scale kinetic ASAT use to nuclear war. They argue that it will not be used, just as nuclear weapons have not been used, because the cost would be too great. The chain reaction described by the Kessler Syndrome is a real possibility; the number of debris pieces is increasing, and experts urge stakeholders to address the problem.

The other argument against kinetic ASAT use concerns its utility. Stakeholders may argue that these weapons are obsolete because they

can destroy only a single satellite in the era of constellations, and even if hundreds of such missiles were launched, they could not seriously damage constellation-based capabilities. In this line of reasoning, space debris is not the primary concern but rather an additional cost associated with using an outdated weapon.

In this paper, we will examine whether these claims and their underlying reasoning are valid. We will also discuss the psychological factors that may influence such evaluations, our current understanding of decision-making in high-stress situations, and how these factors apply to decisions about using ASAT weapons. Without careful evaluation, the risk of severe mistakes increases, and the likelihood of avoiding conflict diminishes with each error.

EARLY THEORIES ABOUT DECISION-MAKING

What is decision-making? According to the American Psychological Association (APA) dictionary, it is the cognitive process of choosing between two or more alternatives, ranging from relatively clear-cut choices, such as ordering a meal at a restaurant, to very complex ones.¹ Multiple theories and models attempt to explain how humans make decisions, especially under pressure, and how decision-making can be improved. This is one of the most significant questions not only in performance psychology, but also in military studies, political science, and for professionals seeking to educate others in these areas.² All the theories until today, and the research done to prove or disprove them, contributed to our body of knowledge and highlighted an important component of decision-making.

¹ American Psychological Association 2018.

² Needless to say, an individual or a group can also make a decision, but a group decision can still be broken down into multiple individual choices. In this paper we will use the term leadership to refer to decision-making groups, but also to individuals with sole authority or a disproportional weight in decision-making.

The rational approach

In the early stages of research, theories about decision-making emphasised the rational element. One of the earliest and most influential theories is expected utility theory (EUT), which has its roots in the work of Daniel Bernoulli, an 18th-century Swiss mathematician. John von Neumann and Oskar Morgenstern expanded on his ideas, and their 1944 book helped spread the concept into business and politics. EUT is still used for investment decisions, location decisions and risk management. Their key idea was that utility (value and satisfaction) dominates every decision, and this can be quantified to model behaviour.³

The mathematical framework of EUT was used to formulate rational choice theory (RCT) by William Riker, which was favoured for a period in economics and political science. This approach used economics and game theory to develop mathematical models of politics and essentially assumes that people behave as if they are calculating utilities, even if they do not do so explicitly. The theory postulates that the decision-maker is primarily a logical, rational actor in a situation and tries to achieve the best outcome. To do this, they weigh all options, estimate the outcomes of different courses of action, assign values to these outcomes, and choose the best conceivable option. However, rational choice theory also emphasised that all decisions occur within an institutional framework, and the structure of these institutions presents the opportunities available to politicians.⁴

EUT introduced the element of probability and claimed that a decision is made based on the different possible outcomes and the likelihood of each outcome. RCT also uses probability but emphasises the consistency and logic of choices, and it has a broader sociological and political framework.

When examining how EUT and RCT were applied, it becomes clear that both theories were used in multiple ways. First, they were regarded as descriptive, attempting to explain how people make decisions. Experts also tried to use them as predictive tools to forecast the future. Problems with these predictions became apparent, especially in the case of expected utility

³ VON NEUMANN – MORGENSTERN 1944.

⁴ RIKER 1962.

theory.⁵ Despite these inaccuracies, EUT and RCT were sometimes applied as normative guidelines for how people should make decisions.⁶ The mismatch between what is and what should be, according to an individual, can often lead to errors in the evaluation of phenomena and in reasoning.

Searching for alternatives to rationality

Another significant theory comes from John W. Atkinson. While related to rational theories, his focus shifts away from expected gain. His achievement motivation theory (AMT) identifies three components: motive, expectancy and incentive. Motive is the individual's desire or need that drives them toward a given action or decision. Expectancy refers to the belief in the likelihood of achieving the desired outcome. Finally, incentive consists of the perceived value of the outcome.⁷ In this theory, motivation is more important than incentive (i.e. utility). Hope of success prevails over fear of failure, and sometimes a personal challenge is more important than maximising reward. This theory has been debated and revised multiple times over the years, but motivation remains a key component in current models as well.

Herbert Simon's research into decision-making is also important to consider when examining high-stress situations and the process of choosing options. Compared to the prevailing mathematical frameworks of his time, he focused on real-life observations. To support his bounded rationality theory (BRT), he showed that people are not perfectly rational agents as portrayed in economics. Due to limited cognitive resources, time and information, people do not always choose the best possible option and cannot always follow a slow, analytical, rational path. Instead, they aim for a minimum acceptable level. This is applicable to tense political situations as well, where politicians might opt for solutions that avert immediate disaster rather than seeking the perfect strategic step. Simon used the term 'satisficing',

⁵ KAHNEMAN–TVERSKY 1982.

⁶ BRIGGS 2023.

⁷ ATKINSON 1957.

created from the combination of satisfy and suffice. Bounded rationality is not necessarily irrational; it can also mean that decisions are made faster and can be more effective than becoming paralysed by analysis.⁸ This already indicates that an analysis and the resulting conclusion made under normal, calm circumstances will be very different from a decision made under high-pressure circumstances. So even if a purely rational approach is possible when confronted with kinetic ASAT usage, the mental process in the actual situation will not be the same.

What utility or perceived benefit means during a space conflict highly depends on the conviction and motivation of the leadership. This can be illustrated by the question: "What is best for my country?" We can understand how vastly different the answers from leadership can be to this inquiry.

BEYOND RATIONALITY – OTHER FACTORS IN DECISION-MAKING

Atkinson and Simon have already shown that the strictly rational, logical model of humans is inaccurate. The various theories developed in recent decades may differ in details, but all agree that decision-making is not a strictly rational process. Logic, normative and rational models, acquired knowledge, and experience are very important, but they can be heavily influenced by emotions, heuristics (mental shortcuts that reduce decision-making time and save cognitive effort), and resulting cognitive biases.

Emotions

The role of emotions in decision-making is often downplayed or dismissed when strategic choices are on the table. The use of data, computing power, rational and scientific methods, and a calculating approach seemingly

⁸ SIMON 1955.

ensures that emotions do not play a significant role in such decisions. This reflects the belief that rational decision-making is possible.

The first experiment to seriously challenge this assumption led to the somatic marker hypothesis. This hypothesis was formulated after Damasio and colleagues studied patients with damage to the ventromedial prefrontal cortex (VMPFC), a brain region involved in processing emotions and linking them to thoughts and memories. These patients retained all their intellectual abilities, yet struggled with even simple everyday choices, spending hours analysing pros and cons for decisions as trivial as choosing a restaurant. Damasio concluded that emotions, or emotion-based somatic markers, are necessary for decision-making; without them, paralysis can occur. He later expanded on this idea in his book, also criticising Descartes's mechanistic approach.⁹

Logical analysis can generate a list of options and deepen understanding of the situation by presenting arguments and outlining possible future scenarios, but the emotional state, previous experiences, and memories of the leadership will influence the final decision. The weight assigned to certain arguments and the selection of a specific course of action are only partly rational.¹⁰ For example, when faced with a potentially catastrophic outcome, fear can lead to 'worst-case thinking', where even low-probability catastrophic events are treated as certainties, prompting disproportionate pre-emptive action. Applied to our topic, this could mean that kinetic ASAT usage might be justified to avoid an even greater perceived threat.

Biases

The theories may differ in detail, but they all agree that decision-making is not a strictly rational process. Logic, normative and rational models, acquired knowledge, and experience play a role, but decisions can be heavily influenced by emotions, heuristics (mental shortcuts that decrease decision-making time and save cognitive effort), and the resulting cognitive biases.

⁹ DAMASIO 1994.

¹⁰ NEWELL–SHANKS 2023.

A bias is essentially a heuristic gone wrong that becomes a fault in reasoning, leading to erroneous conclusions and potentially negatively affecting decisions. There are many biases, and although an exact number has not been identified, it appears there are over 100 different ways to make mistakes in reasoning. Nadurak offers a conceptual analysis and provides a broad definition of heuristics as simple methods of judgment, decision-making and problem-solving that, using little information and cognitive resources, generally enable the achievement of the intended goal. He defines cognitive biases as systematic, non-conscious errors in cognition that occur when we base our reasoning on irrelevant or partially relevant information and ignore what is relevant.¹¹

In this paper, we mention only a few well-known biases to make the reader aware of their influence. Confirmation bias is one type that affects decision-makers. They may unconsciously seek out information that confirms their pre-existing beliefs about an adversary and ignore even meticulously prepared information that contradicts those beliefs. For example, they might interpret defensive measures by an adversary as offensive preparations. Examples include Soviet behaviour before Operation Barbarossa, U.S. assessments before the Chinese attack in the Korean War, and Israeli leadership before the 1973 Yom Kippur War, all of which show such biases in effect. There were many reports, estimates and information about what was going to happen, but these were disregarded, blocked, or explained away, and sometimes even whistleblowers were punished.¹²

Normalcy bias describes our tendency to underestimate the possibility of a major adverse event because it has never happened before.¹³ This should not be confused with optimism bias, which refers to the tendency to overestimate the likelihood of positive events and underestimate the likelihood of negative events. The opposite of normalcy bias would be overreaction or worst-case scenario thinking, which can interpret every unusual or even insignificant change as a sure sign of a major negative event. Research has also established that even when presented with contradicting

¹¹ NADURAK 2025.

¹² WIRTZ 2024.

¹³ The Decision Lab 2023.

information, humans actively sample evidence to support prior beliefs.¹⁴ All of these can result in a decision to use kinetic ASAT weapons or can lead to shock, low resilience, and hasty reactions in the event of such an attack.

It is worth noting that it is well-known throughout history that no single person is infallible or omnipotent. This is why leadership, regardless of the power structure or concentration of power, always includes multiple people as advisors or in supporting or executive roles. The main idea is that they can compensate for each other's weaknesses and reach the best possible conclusion. For such a system to function, many requisites must be met, such as trust among participants, competency, and the absence of internal power struggles. Groups are also affected by different biases, such as favouritism (in-group bias), the homogeneity effect (viewing outsiders as inferior), conformity bias (groupthink and the tendency to agree with the majority), and false consensus bias (overestimating how many agree within the group). As we see, the group as a structural unit does not solve the problem; from a certain perspective, it can even complicate things.

Daniel Kahneman and Amos Tversky researched biases and, as a result, formulated Prospect Theory (PT). They established that people tend to focus on loss aversion, feeling more strongly about losing something than about gaining the same thing. This also leads to higher risk-taking behaviour when someone wants to avoid or make up for losses. They discovered that outcomes are not judged in absolute terms but are always compared to a reference point, usually the status quo. This also loosely connects to anchoring bias. The reference point plays a significant role in sensitivity to losses and gains; the further we are from the reference point, the more sensitivity diminishes. Leadership may also be prone to overweighting small probabilities and underweighting high probabilities.¹⁵ This is why people play the lottery or have insurance against fire.

Another important result from Kahneman and Tversky is the framing effect. A crucial guideline for any analyst or intelligence officer is how information, choices and expected outcomes are presented. In the Asian disease experiment, participants were told that the disease was expected to

¹⁴ KAANDERS et al. 2022.

¹⁵ KAHNEMAN–TVERSKY 1979.

kill 600 people, and there were two programs to counter the threat. Program A would save 200 people, while Program B had a 33% chance of saving all 600 and a 66% chance that everyone would die. Risk aversion dominated the responses, with 78% choosing option A to guarantee saving 200 people. The second group received two options as well: Program C would result in 400 deaths, and Program D was identical to Program B. The results were the reverse; the certain death of 400 people was less preferred than a 66% chance that all 600 would die. To avoid a certain loss, participants were willing to take a risk. Mathematically, Programs A and C produce the same result, so the key difference was the framing of the expected outcomes.¹⁶

Experts agree that how information is gathered, analysed, presented, and received by key stakeholders and leadership is complex and affected by these biases and effects. Because of the complexity of the system and the persistent nature of these elements, experts know the process cannot function without mistakes, but there are ways to mitigate their effects.¹⁷

Biases and the framing effect also apply to the problem of ASAT usage. For example, the difference between losing 10 and 20 satellites feels larger than losing 1,010 or 1,020 units. Similarly, launching 10 versus 20 kinetic ASAT missiles feels more significant than launching 210 versus 220. If leadership is unaware of these effects, they can make mistakes, or if they are aware, they may actively use them to apply pressure on the adversary.

THE QUESTION OF DUALITY

Atkinson and Simon already demonstrated that the strictly rational, logical model of humans is inaccurate. This idea was shared by researchers who proposed a dual approach. The notion that cognition and decision-making can be divided into two separate modes or systems is not new. Plato distinguished between reason and appetite; Aristotle theorised about rational and irrational parts of the soul; William James, a key figure in modern psychology, considered associative and proper reasoning; while Freud

¹⁶ TVERSKY-KAHNEMAN 1981.

¹⁷ WIRTZ 2024.

described the conscious and unconscious parts of the mind. Kahneman's Dual Process Theory is a well-known example of such systems.¹⁸

System 1 and System 2 – Fast and Slow

Kahneman identified two distinct systems for cognition and decision-making: System 1 and System 2 thinking. The first system is fast, automatic, heavily influenced by emotions and the subconscious. It relies on heuristics (mental shortcuts). System 2, on the other hand, is slow, effortful, logical and conscious. It is used to evaluate complex problems, perform calculations and check the impulses of System 1. In Kahneman's theory, System 2 is regarded as a domain-general processing mechanism, not focused on a specific task but capable of handling a wide variety of challenges.¹⁹

The theory has been widely debated, with evolutionary and cognitive psychologists emphasising different aspects and discussing the primacy of one system over the other. Currently, most cognitive psychologists agree that there are two mental processes and that these systems compete for dominance. System 1 predates System 2 on the evolutionary timeline, and a significant portion of evolutionary psychologists reject the two-minds theory, accepting only the modularity of mind hypothesis. This hypothesis suggests the existence of a network of specialised subsystems (essentially tools) rather than two broad, general systems (two operating modes). Yet, the same information is available to multiple subsystems, and humans must cope with various situations that were not present in evolutionary environments. Therefore, a meta-system must exist to regulate different mechanisms. There seems to be a growing consensus for the existence of System 2, but the exact relationship and mechanism by which System 1 and System 2 interact still require further investigation.²⁰

How System 2, the rational, planning system, can give way to System 1 is an important question regarding human decision-making. System 2

¹⁸ ZIELONKA et al. 2024.

¹⁹ KAHNEMAN 2011.

²⁰ DA SILVA 2023.

requires significant cognitive resources, so whenever possible, it defaults to System 1. Under pressure or when fatigued, System 2 can be hindered, and ego depletion may occur. This means that more complex and demanding tasks might be oversimplified and delegated to System 1.

Similarly, under time pressure, System 2 does not have time to analyse, so it reverts to System 1 to provide a 'good enough' answer. If a task is performed often enough, it becomes routine and shifts from the energy- and attention-demanding System 2 mode to System 1. This underlies habits or automatic behaviour. A common example is driving: when learning, it requires concentration and conscious effort, but it can become a routine task over time. Decision-making is also delegated in low-stakes situations. Overconfidence in the initial intuition, the first answer suggested by System 1, might also inhibit System 2 analysis.

Critiques of duality

In recent years, researchers have suggested that the sharp distinction between System 1 and System 2 may be too rigid and arbitrary, and that both systems participate in decision-making. Therefore, a hybrid approach may be more reasonable. Hybrid models propose that people's intuitive reasoning performance is determined by the absolute and relative strength of competing intuitions.²¹ Others have argued that the entire concept is flawed, that supporting evidence is merely confirmation bias, and that dual-process theories are unfalsifiable.²²

However, regardless of opinions about dual-process systems, the surrounding debate has clearly established that emotions, automation and subconscious influences are crucial factors in cognitive processes. Emotions are no longer considered the opposite of rational thought but are recognised as vital components of both intuitive and deliberate processing, and thus as major factors influencing decision-making. Cognitive automation, when established through practice, can be an effective tool for reducing cognitive

²¹ BAGO – DE NEYS 2020.

²² GRAWITCH 2024.

load, though it carries the risk of shortcuts when analysis is required. In addition, subconscious influences shape perceptions and decisions without conscious awareness.²³

Gary Klein criticised approaches such as Kahneman's and claimed that experts have a different mode of decision-making. Klein's Recognition-Primed Decision (RPD) model argues that experts (such as military commanders, firefighters, etc.) do not compare options; instead, they recognise patterns based on previous experience, mentally simulate a single course of action, and adjust it as needed, without engaging in time-consuming analysis and comparisons.²⁴ A counterargument is that this working mode is essentially a System 1 process, since, according to Kahneman's theory, pattern recognition is a strength of System 1. The Somatic Marker Hypothesis (SMH) adds to this perspective, and experiments indicate that when choices must be made based on previous experience, a physiological reaction (often called a 'gut feeling') can help distinguish between positive and negative options.²⁵

HIGH-PRESSURE ENVIRONMENTS

As we have seen, the interconnectedness and relationships among different systems further complicate the process, and this complexity exists even under normal circumstances. However, high-pressure environments have additional effects on leadership.

Stress

The effects of extreme stress can be significant and can seriously alter decision-making. Stress has well-established and well-researched influences on multiple organs and systems in the body. The muscles, respiratory system,

²³ ZIELONKA et al. 2024.

²⁴ KLEIN 2017.

²⁵ WRIGHT-RAKOW 2023.

cardiovascular system, endocrine system and gastrointestinal system are all affected. Hormones such as adrenaline, noradrenaline and cortisol prepare the body to counter the cause of stress, but the long-term effects of stress can cause significant damage and decrease cognitive capabilities.²⁶ It has been known for more than a decade that sustained stress exposure in both humans and animals keeps the brain in a more primitive, reactive state. Existing cognitive disorders can worsen, and the brain can shift from a reflective, logical mode to reflexive control behaviour.²⁷ Stress can even affect the dopamine system, which plays a key role in stress coping mechanisms, selection and mood regulation.²⁸

Sleep deprivation

In high-stakes situations, decision-makers often experience disturbed or shortened sleep. This can be caused by stress and can create a cycle in which lack of sleep makes recovery and mitigation of stress slower or impossible. Sleep deprivation (extended wakefulness for at least one night) or sleep restriction (insufficient sleep for at least one night), especially over a prolonged period, alters cognitive capabilities and results in suboptimal decisions. In multiple experiments, subjects became worse at risk assessment and were more likely to make increasingly risky choices. Subjects were often less able to weigh potential losses or gains resulting from an action.

Other results suggested that subjects favoured immediate, smaller rewards over delayed, larger gains, and prioritised actions requiring less effort, those that seemed simple, or those that could be delegated. Decision-making also shifted toward simpler, heuristic-based approaches.²⁹ Sleep deprivation not

²⁶ American Psychological Association 2024.

²⁷ ARNSTEN 2015.

²⁸ BAIK 2020.

²⁹ LIM et al. 2025.

only hinders a person's ability to evaluate new information but also makes them more rigid and less receptive to feedback.³⁰

Time and chemicals

A prolonged crisis period before deciding to use ASAT might be considered beneficial by some, assuming decision-makers have time to consider the use of these weapons. Hence, time constraints are not a serious factor. This might be true, but the crisis itself, exhaustion, lack of sleep, and other factors may work against restraint and de-escalation. As a side note, we must mention the age and general health condition of the leadership, as well as the possible effects of various chemicals they might take during the crisis period. Taking stimulants or medication can help suppress the worst symptoms of illness, stress and other problems, but side effects and long-term damage can also impair cognitive functions.

STRATEGIC AND TACTICAL CONSIDERATIONS IN ASAT USAGE

In deciding about ASAT usage, there are various strategic and tactical arguments both for and against the deployment of such weapons. How the strategic situation is assessed depends greatly on the context and the psychological mechanisms mentioned above. It is worth examining a few examples that could serve as the building blocks of a leader's cognitive architecture.

³⁰ WHITNEY et al. 2015.

Deterrence

Strategic considerations suggest that deterrence may be an effective method to prevent kinetic ASAT deployment. In this context, actors must ensure that an attack either fails or that the retaliation or cost – including damage to the space environment – is so high that adversaries are dissuaded from attempting it. Classical rational deterrence theory assumes that no leader is suicidal; therefore, leaders will behave rationally and communicate clearly. However, there have been instances when leaders acted in seemingly irrational ways to shock and confuse their adversaries. The Madman Theory posits that this calculated ‘rational irrationality’ can be effective, but it also carries risks, such as an increased chance of misunderstandings and the possibility of encouraging the adversary to launch an attack. Identifying and analysing this strategy is challenging, and depending on the type and scale of deviation, it can have varying value in coercive bargaining.³¹ In the case of ASATs, they could be used as a threat to gain an advantage, or deployed by the attacker as a strong signal to deter or coerce the other side.

A strong counterargument against using kinetic ASATs is the risk to one’s own space assets, potential international reactions, and the possibility of triggering Kessler Syndrome. However, within a certain logical framework, this very risk and the capacity to inflict massive damage can be seen as an advantage rather than a drawback. Blackmail, coercion and terrorism can all exploit this potential, giving certain countries the option to introduce a modified form of Mutual Assured Destruction in space, which they might be inclined to use, especially when in a losing position. Additionally, the possibility of such damage occurring may not be fully recognised or may be downplayed. Previous ASAT tests have resulted in debris, but, as far as we know, there has not yet been a major accident caused by it, which could further weaken the non-ASAT argument through normalcy bias. Even if accurate assessments, information, or strong recommendations against using kinetic ASATs reach leadership, there is no guarantee they will be

³¹ McMANUS 2019.

considered. Leaders' perceptions of the best course of action may differ significantly from expectations due to numerous psychological effects.

Calculation and escalation

If a leader's mindset is primarily defined by risk avoidance, as described in Prospect Theory, and they perceive a geopolitical situation as a significant loss (such as losing territory, influence, political legitimacy, etc.), they may become risk-seeking and statistically more likely to authorise an ASAT attack, even when there is potential for escalation or collateral damage to other space assets.³² For example, when an adversary's military forces are suffering significant losses due to precision strikes guided by enemy satellites, the prospect of blinding the enemy's satellites – even at a higher cost – becomes increasingly appealing. This can, of course, trigger escalation, but as we have seen, under pressure, immediate gains often outweigh long-term consequences, especially if those consequences are not fully understood or are perceived as manageable later.

The fact that most space assets do not have human personnel on board also makes it easier to cross the ASAT threshold, since no human lives – especially civilian – would be lost. While the attack itself might trigger escalation and potentially lead to war on Earth or damage critical infrastructure systems so severely that people die as a result, there remains a psychological distance and several steps between this and directly ordering the bombing of a city. This calculation may not necessarily have a moral foundation; it could simply be a cold assessment aimed at limiting diplomatic or reputational damage while still inflicting serious harm on enemy capabilities.

When discussing conflict and escalation, we must consider Robert Jervis's observation that decision-makers tend to overestimate their own transparency and the clarity of their communication. They often assume that the enemy understands their intentions and interprets them as defensive or as a proportional response. For example, they might believe that a single

³² KAHNEMAN–TVERSKY 1979.

kinetic missile launch is proportional to a cyberattack that temporarily disables hundreds of their satellites. They may also assume that other leaders will behave as they themselves would, which can lead to further miscalculations.³³ Despite the first edition of his book being published in 1976, this issue remains unresolved and continues to be a challenge. A 2017 space wargame exercise conducted by the Centre for Strategic and International Studies (CSIS) warned that actors interpreted the severity and meaning of the same action differently, depending on context and their role (attacker vs. defender). The players were more reluctant to use kinetic attacks, viewing them as more escalatory than cyberattacks, but a kinetic attack still occurred in all three scenarios played.³⁴

Another escalation mechanism is the damage-limitation window. This concept, originating from nuclear strategy studies, refers to a window of opportunity that could close as the conflict progresses, either due to enemy actions or the degradation of one's own capabilities.³⁵ The same logic applies to space assets; combined with the fear of loss (i.e. losing an expensive, vulnerable asset without the chance to use it), this can be a strong incentive to launch a preemptive strike and attempt to seriously damage the opponent's ASAT and space capabilities.

Another factor is the entanglement between nuclear and non-nuclear systems, such as early-warning systems used both to locate and destroy the opponent's nuclear forces and to conduct missile defence operations. This can serve as a strong argument against using ASAT weapons, since harming these systems could be misinterpreted. Even a cyber espionage action could be perceived as an attack. On the other hand, the emergence of constellations and private actors providing Earth observation and communication capabilities – but not strictly part of any military system – means these assets can be considered valuable and legitimate targets, but their destruction may not be viewed as equally escalatory.

The following chart lists several possible reasons against and for the use of a kinetic ASAT.

³³ JERVIS 1976: 354–355.

³⁴ HARRISON et al. 2017.

³⁵ ACTON 2018.

Table 1. *Simulated list of reasons for kinetic ASAT attack*

For kinetic ASAT usage	Against kinetic ASAT usage
fear of loss in case of an enemy pre-emptive strike	negative international feedback
assumption that the enemy does not expect such an attack (surprise element)	possibility of a third country entering the conflict
readiness to escalate	ground stations are easier targets even for kinetic attacks
already low international standing	sufficient non-kinetic option (e.g. cyber
highly developed ADR technology	zero-day attack vulnerability)
low congestion of target orbits (MEO) – lower chance of Kessler Syndrome	credible adversary deterrence
strong advisor support for an attack	tendency for overreaction bias

Source: Compiled by the author.

Apart from imagining a situation where this chart would be accurate, the reader surely notices that the number of arguments is not the same. New elements could be added, or a list of pairs for each item could be provided. Changing the order of listed arguments or the side where pro and contra arguments are shown can also slightly influence the decision. However, the main takeaway is that despite the imbalance in the list, it is never a simple counting game. Each item will have a different weight depending on the context and the leadership’s expertise, psychological profile, physiological state, biases and other factors.

FUTURE DEVELOPMENTS

Connected to our topic, we can theorise that opinions about kinetic ASAT assets can quickly become obsolete and change rapidly. This is due to ongoing developments and changes in space infrastructure and ASAT options. To counter kinetic ASAT threats, countries have developed the concept of satellite constellations, so even if an adversary destroys 100 satellites, enough may remain to provide service.

Possible change in targeting

The next logical offensive step would be to develop options that can damage an entire constellation or destroy a large number of units quickly. To counter a constellation of satellites, there are two logical options. The first is an attack that disrupts the entire system. A cyberattack could potentially disrupt the whole network, although this is difficult and requires time to identify vulnerabilities and prepare an attack.

The second option is an attack that eliminates a large number of units simultaneously. This idea, already seen in the 1960s, involves detonating a nuclear warhead at the right altitude to disable a significant portion of a constellation, creating a gap in global coverage that the attacker could exploit. Even if rapid replenishment or countermeasures can mitigate the effects, full recovery is unlikely, and there will still be a window of opportunity for the adversary.

For a space power that already possesses nuclear weapons, this capability is much easier to achieve than the precise targeting of thousands of units. There is a resurgence of ideas from the early Cold War, where detonating a nuclear warhead at the right altitude would indiscriminately disable a large percentage of satellites. A more advanced electromagnetic pulse weapon could achieve similar results. Leadership on the losing side of a conflict might feel existentially threatened. If they did not have many space assets to begin with, or if their assets are already useless or destroyed, the leadership might ignore all other warnings and resort to such an option.

It may seem that new debris fields would not be created, as with kinetic ASAT attacks, removing one counterargument against their use. However, this is faulty reasoning, because the hundreds or thousands of now-defunct satellites would become new debris. This could quickly become a major problem due to the crowdedness of the most popular orbits. These orbits are so busy that Starlink satellites had to conduct collision avoidance manoeuvres 144,000 times in the first half of 2025.³⁶ According to some estimates, if satellites became unresponsive, collisions would begin in just

³⁶ DE SELDING 2025.

2.8 days due to the crowded nature of key orbits.³⁷ As a result, the question changes: the issue is not whether a country will use kinetic ASAT weapons, but whether they will use any weapon from the expanding toolkit capable of causing damage on that scale.

New technologies – A blessing and a curse

According to numerous reports, new defensive measures are under development. France announced that it will use multiple R&D projects to protect its satellites. At the same time, it increased the budget for these programs and took steps to involve private corporations.³⁸ This can ensure deterrence and greater resilience for the country's space assets, but it also raises the level of threat perception and uncertainty among adversary leadership. It may also alter strategic calculations, and some could argue that in the event of an attack, all available ASATs should be used to overwhelm defence capabilities.

Co-orbital manoeuvring capability is another approach being pursued by both governments and private corporations. These capabilities are necessary for in-orbit servicing, can serve as versatile military assets, or be used for active debris removal (ADR) missions. However, highly developed ADR in the future might reduce the perceived seriousness of a kinetic attack because, in theory, debris could be cleaned up.

It is possible that the most advanced space powers may eventually reach a level of ASAT technology where current kinetic options are considered too crude and ineffective. However, technological advancement is not uniform worldwide. The level achieved by primary space actors is difficult to attain, and kinetic ASATs may still be valuable options for second- or third-tier space actors, such as rogue states or terrorist organisations. A similar example is the missiles and drones built by various terrorist organisations and rebels in the Middle East. Their technology is crude compared to current high-end

³⁷ PULTAROVA 2025.

³⁸ DESMARAIS 2025.

missiles, but they are inexpensive, relatively easy to manufacture, and the necessary technology has proliferated as the general technological level of the global population has risen.

SUPPORTING HUMANS

Regardless of how many new strategic considerations and technological developments emerge in the future, the human factor will remain significant for a long time. When discussing high-stress performance, including military operations or periods of intense conflict, the goal is optimisation: ensuring that people in key positions maintain executive functions and emotional regulation.

Artificial intelligence and training

In recent years, there has been hope that AI systems will aid decision-making to such a degree that it will become more effective, less prone to human flaws and much faster. Optimists even suggest that AI will become so advanced that it will surpass all humans, and keeping a human in the loop will only slow the system and reduce its effectiveness. This could be a key difference between losing and winning the super-fast wars of the future. The idea of removing the weak human link in the chain is not new; during the Cold War, similar suggestions were made for nuclear control systems, such as the Soviet Perimeter system. Others argue that this is too dangerous or simply too far in the future, and that, at least for now, a human must remain in charge. Therefore, every suggestion by the AI will be evaluated and judged by a human, with the same biases, emotions and experiences.

De-biasing training, advanced stress training through exercises, cognitive red teaming, institutionalised roles for disagreement and fault detection (such as the Devil's Advocate role) to counter groupthink, simulation exercises, and wargames are all valuable tools to help decision-makers, their advisors, and the military general staff address these challenges.

One exercise type could be cross-domain wargaming, where multiple risk levels, domains and problems are presented. A built-in overreaction from an adversary team, or one announced by the game-coordinating white cell, could highlight the complexity of the situation and the mismatch between the enemy's mental construct (how they 'should' behave) and their actual reaction. Other exercises could focus on attribution, differentiating between an attack and other causes, technological capabilities, risk assessment and long-term consequences.

Machine support and human augmentation

Because humans will remain a constant and crucial component in decision-making, augmenting human capabilities makes sense. There is a will to find tools to achieve optimisation, not through training but via external aid. One approach is Non-Invasive Brain Stimulation (NIBS), a technique that aims to achieve results by peripheral nerve stimulation, essentially making neurons more likely to behave in ways associated with cognitive control.

One type of NIBS is Transcranial Magnetic Stimulation (TMS), which delivers a transient magnetic field to the scalp. This creates a brief electric impulse in the brain, and with different frequencies, it can inhibit targeted brain areas or increase cortical excitability.³⁹ Regarding performance under severe stress, researchers have experimented with targeting the left dorsolateral prefrontal cortex (DLPFC), a brain region associated with stress responses and attentional control. Stimulating the DLPFC with TMS has shown promising results for target processing under stress.⁴⁰

Transcranial Electrical Stimulation (tES) does not cause neurons to fire like TMS; rather, it primes them. One type of tES is direct current stimulation (tDCS) or alternating current stimulation (tACS). The tDCS techniques applied in experiments have produced mixed results, but they remain an interesting research direction. According to a 2017 study supported by DARPA, skill acquisition appears to be up to 40% faster with tDCS

³⁹ CARRARINI et al. 2025.

⁴⁰ QI et al. 2025.

support.⁴¹ More recent results suggest that tDCS can enhance military multitasking performance and reduce cognitive overload in different roles.⁴²

A different method is transcutaneous vagus nerve stimulation (tVNS), which affects the parasympathetic system to counterbalance the sympathetic (fight or flight) response and related effects such as panic and muscle tremors. As such, it can aid tasks that require a steady hand. A 2025 experiment with elite shooters showed a significant reduction in cognitive and somatic anxiety, depression and stress.⁴³ The use of such devices could transform decision-making, training and warfare. However, it also raises certain moral questions, and extensive research must be conducted to ensure users do not suffer any long-term damage.

CONCLUSIONS

Various theories of decision-making and their supporting evidence reveal that the 'rational actor' is a myth, especially in high-stress environments with all the uncertainties and pressures of conflict or war. Humans are complex, and multiple systems and factors shape our decision-making. Motivation, emotions, heuristics, biases, automatism, experience, strategic and tactical considerations, institutional and political environments, physiological traits, and even the amount of sleep all impact the decision-making process and its outcomes. Rationality and logic have their place, but the weight assigned to a particular argument, the choice of the best course of action, and the definition of a valuable outcome are only partly logical.

This also applies to those who declare that one course of action will never happen. This is basically a claim, that regardless of emotions, biases, physiological state, strategic situation, inter-group dynamics, etc. leadership will always come to the same conclusion and not use a capability. Such assumptions are unrealistic and can be very damaging in a real crisis situation.

⁴¹ KRAUSE et al. 2017.

⁴² NADLER et al. 2025.

⁴³ PARK et al. 2025.

The advocates of the “they would never do X” approach, have an evaluation and decision-making processes affected by the same flaws and factors discussed in this chapter. For example, using the absence of nuclear war as an argument against the possibility of kinetic ASAT use can be linked to wishful thinking, confusing an ontological ‘should’ with an ‘is,’ could be an attempt of normative regulation, maybe it is a form of normalcy bias or a combination of all the above. It may also reflect expert projection bias, when a highly experienced person assumes a decision-maker will have the same knowledge and assessment as they do.

All these errors can lead to mistaken or delayed responses, decreased resilience, and unpreparedness to defend against certain types of threats. Training and supporting leadership, high-ranking officials, and advisors is an essential, above all, continuous task. Psychology has decades-old findings about decision-making, but the problem of bias and fallacies persists due to changing circumstances and the rotation of people in key positions. Avoiding the use of kinetic or mass-damage ASAT weapons is a goal worth pursuing, but disregarding the complexities of human decision-making and strategic factors will not help achieve it. Instead, a nuanced view and tailored tools may be more effective.

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LEGAL ARCHITECTURE VS. REALPOLITIK IN NATO MILITARY SPACE ACTIVITIES

Strategic Darwinism and Pragmatism in Future Space Warfare

INTRODUCTION

This chapter examines the widening gap between the formal legal architecture of the governance of space activities and the operational realities of NATO military space activity. It argues that NATO has become increasingly competent at coordinating access to space effects without becoming a sovereign space power in its own right. The Alliance has recognised space as an operational domain, established staff structures, and begun building multinational programmes, such as the Alliance Persistent Surveillance from Space initiative. Yet it still depends heavily on national capabilities, above all those of the United States, and increasingly on commercial providers for communications, intelligence and space domain awareness. That dependence is not merely a budgetary issue. It shapes command relationships, procurement speed, doctrine, escalation management and the political meaning of 'alliance capability' itself.¹

The chapter advances three central claims. First, NATO's space posture is best understood as a coordination and integration model rather than a capability-ownership model. This has advantages in terms of access speed, political flexibility and burden-sharing, but it also leaves the Alliance exposed to asymmetries in ownership, decision-making authority and industrial influence. Second, the legal regime governing space activities remains

¹ NATO 2026a.

foundational but insufficient. The Outer Space Treaty and associated conventions continue to matter, especially on responsibility, liability, registration and the prohibition on weapons of mass destruction in orbit, but they do not provide an operational rulebook for a domain now characterised by dual-use systems, commercial–military fusion, cyber vulnerabilities, jamming, dazzling, rendezvous and proximity operations, and strategic competition below the threshold of declared hostilities. Third, the strategic environment increasingly rewards speed, resilience and integration over procedural purity. In practice, the actors that can move fastest from collection to decision, from warning to tasking, and from commercial access to military effect will dominate.²

The chapter, therefore, frames current developments as a form of strategic Darwinism in orbit. The phrase is not used to celebrate lawlessness, but to describe a competitive ecosystem in which survival favours actors that adapt faster than institutions can codify. NATO cannot solve this challenge simply by repeating that space is important. It must decide whether it will remain a broker of space effects generated elsewhere or evolve toward a more coherent model of allied military space power.³

BLUF AND KEY TAKEAWAYS

NATO is now far beyond the stage at which outer space could be treated as a specialist support function. Space-enabled services are indispensable to modern deterrence, crisis management and multi-domain operations. Communications, precision timing, missile warning, environmental monitoring, position, navigation and timing support, and, increasingly, the fusion of commercial and national imagery all shape the speed and quality of military decisions. Yet NATO's progress is uneven. The Alliance has political recognition, growing organisational maturity, and selected multinational initiatives, but it still lacks the sovereign depth that would

² NATO_{2026b}.

³ NATO ₂₀₂₅.

allow it to fight, sustain and adapt in the space domain without leaning heavily on the strongest Ally and the market.⁴

The most important takeaway is blunt: NATO is a space-dependent alliance, not a fully sovereign space actor. The distinction matters. A sovereign actor owns critical layers of the architecture, sets priorities without dependence on external providers, and can align political authority with operational control at speed. NATO does not yet meet that standard. The second takeaway is that commercial integration is no longer optional. The 2025 NATO Commercial Space Strategy reflected not fashion, but necessity. Commercial firms now provide capacity, revisit rates, niche analytics, radio-frequency sensing and resilient communications at a speed that no traditional alliance bureaucracy can replicate on its own. The third takeaway is that legal and policy language still lags operational reality. NATO can speak about resilience, responsible behaviour and peaceful purposes, but commanders must also think about contested access, interference, deception and denial. Finally, the war in Ukraine, together with U.S. and allied adaptation during 2024–2026, has shown that the decisive issue is not whether space matters, but whether the user can turn dispersed space-enabled data into a timely operational advantage.

For NATO, the policy consequence is clear. Either it accepts a permanent model of structured dependence on the U.S. and commercial systems and optimises around that fact, or it begins building a more sovereign allied layer of persistent surveillance, assured access, protected data pathways and faster procurement. The worst option is strategic ambiguity: talking like a warfighting actor while resourcing only a coordination secretariat.

NATO'S SPACE REALITY: ORGANISATION, ACCESS AND THE PROBLEM OF OWNERSHIP

NATO's contemporary space posture rests on an institutional paradox. On paper, the Alliance has made real progress. It declared space an operational

⁴ NATO 2026c.

domain in 2019. It established a NATO Space Centre at Allied Air Command in Ramstein. It works through the Combined Force Space Component Command⁵ and related structures to improve coordination, planning and awareness. It has also begun to support multinational efforts such as the Alliance Persistent Surveillance from Space programme, which is designed to pull data from a 'virtual constellation' of national and commercial satellites into NATO's intelligence ecosystem. These are meaningful steps. They reflect a serious recognition that the Alliance cannot conduct modern deterrence and defence without integrating space effects into planning and execution.⁶

But the gap between recognition and ownership remains profound. NATO does not field a NATO-owned sovereign Intelligence, Surveillance and Reconnaissance (hereinafter: ISR) constellation comparable to its historical collective ownership model in airborne early warning. It does not control a fully allied military satellite communications architecture independent of national decision chains. It does not own a robust space domain awareness layer capable of supporting alliance decision-making without external dependence. In practical terms, this means NATO's 'space capability' is often an aggregation of access arrangements rather than an inventory of owned systems. Such aggregation can be efficient during peacetime. It is more uncertain in crisis, when commercial availability, national release authorities, and competing operational priorities may not align neatly with alliance timelines.

This matters because capability is not just about hardware. It is about who decides, who prioritises, who can retask, who assumes risk and who absorbs loss. In a high-tempo contingency, the actor that owns the sensors, transport layers, tasking authorities, and analytic pipelines enjoys an advantage over the actor that merely requests access. NATO can mitigate this through standing agreements, pre-negotiated release procedures and persistent multinational integration, but not eliminate it. Indeed, one of the recurring

⁵ Starting from 2026 May, the Combined Force Space Component Command became Space Theatre Component.

⁶ NATO 2026c.

features of alliance military space activity is the mismatch between collective political rhetoric and nationally retained control over decisive assets.

The Alliance Persistence Surveillance from Space (hereinafter: APSS) initiative is strategically important precisely because it acknowledges this reality and tries to manage it. Rather than waiting for an idealised NATO-owned constellation that is politically and financially unlikely in the near term, APSS seeks to network national and commercial systems into a common surveillance architecture. That is intelligent pragmatism. Yet it is also proof of structural dependence. A ‘virtual constellation’ is, by design, a substitute for sovereign ownership. It may be the correct substitute for the current decade, but it remains a substitute.⁷

The same applies to the growing emphasis on commercial space. NATO’s 2025 Commercial Space Strategy explicitly aims to create more coherent and effective relationships with allied industry and to ensure commercial services are available in peace, crisis and conflict. This is a necessary adaptation to the reality that the commercial sector now innovates faster than most ministries and can deliver operationally relevant data at scale. But the more NATO leans on the market, the more it must confront uncomfortable questions. What happens when the market’s risk tolerance diverges from alliance operational requirements? What happens if a key provider becomes the target of political coercion, cyber disruption, or kinetic interference? What happens if legal obligations to shareholders collide with military needs?

For these reasons, NATO’s space reality should be described with precision. It is not weakness, but it is not sovereignty. It is a hybrid model built on national power, commercial dynamism and alliance coordination. Its strength lies in flexibility and breadth of access. Its weakness lies in uneven control. Any serious chapter on NATO military space activity must begin there.

⁷ NATO 2025.

THE UNITED STATES AS THE DE FACTO BACKBONE
OF ALLIANCE MILITARY SPACE POWER

Any honest assessment of NATO space activity must acknowledge the central role of the United States. The United States is not simply the largest contributor. It is the backbone of the alliance's military space power in terms of doctrine, enabling infrastructure, protected communications, national technical means, missile warning, launch industrial base, and the institutional ability to connect space effects to terrestrial operations at scale. This reality is sometimes softened in diplomatic language because alliance politics prefers the idiom of cohesion to the vocabulary of hierarchy. Yet hierarchy exists, and in the space domain, it is impossible to ignore.

The creation and maturation of the U.S. Space Force and the operational role of the U.S. Space Command have accelerated a model of military space activity that NATO inevitably studies, borrows from, and in many ways depends upon. U.S. official statements in 2025 repeatedly stressed that space is a warfighting domain and that resilient command and control, combined with data fusion and rapid integration of commercial capabilities, are essential for future competition and conflict. That framing matters. It moves the debate beyond passive 'use of space' and toward the active organisation of space power for deterrence and warfighting.⁸

For NATO, this produces both reassurance and dependency. Reassurance, because the Alliance benefits from a leading Ally with unmatched scale, mature command structures, and a demonstrated ability to integrate military and commercial systems. Dependency, because NATO's own institutional layers begin to mirror or administratively process U.S.-generated logic without owning the underlying instruments. This is the risk of what might be called derivative warfighting: adopting the language of resilience, contested logistics and integrated C2 while depending on another actor to actually provide the sensors, data transport and operational depth.

There is also a subtler consequence. As U.S. military space institutions move faster, NATO's consensus machinery can appear increasingly slow by

⁸ United States Space Force 2025a.

comparison. The Alliance can endorse strategies, host exercises and establish coordination nodes; however, speed in the space domain is measured in terms of tasking cycles, warning latency, data fusion and procurement adaptation. If U.S. institutions evolve at ‘rocket speed’ while NATO committees evolve at diplomatic speed, the gap between the backbone and the alliance wrapper will widen. That gap is manageable when interests align, and crises remain limited. It becomes more dangerous when priorities diverge geographically or politically.

This is not an argument against U.S. leadership. On the contrary, NATO presently needs it. But it is an argument for analytical clarity. If NATO leaders want a more autonomous European and allied contribution to military space effect generation, they must invest in the layers that currently remain overwhelmingly American: persistent surveillance, scalable commercial contracting mechanisms, robust mission integration, space domain awareness, and protected pathways from space collection to operational users. Without that, ‘allied’ space power will continue to mean access to U.S.-enabled effects under a cooperative political umbrella.

The U.S. role also shapes industrial expectations. American models of commercial integration, bulk contracting, and rapid adoption increasingly define what ‘modern’ space support looks like. NATO’s own Commercial Space Strategy was therefore not emerging in isolation. It was emerging in an ecosystem already transformed by U.S. experience with commercial imagery, proliferated architecture, responsive launch discourse, and cross-domain command integration. NATO can adapt this model, but it cannot wish away the asymmetry at its core.⁹

COMMERCIALISATION, APSS AND THE RISE OF THE HYBRID SPACE ARCHITECTURE

The most important structural shift in recent military space practice is the collapse of the old conceptual divide between ‘government systems’ and

⁹ United States Space Force 2025b.

‘commercial systems’. That divide still exists in procurement categories and security classifications, but operationally, it is fading. Commercial constellations provide imagery, radio-frequency data, analytics, and communications that are directly relevant to military users. Government systems still provide exquisite capabilities, sovereign control and mission assurance, but they increasingly operate within a broader ecosystem in which value comes from hybridisation rather than purity.

NATO’s recent policy evolution reflects this. The Commercial Space Strategy agreed in February 2025 recognises that the Alliance must create enduring relationships with the commercial sector, reduce barriers to access, and ensure continuity of commercial services in peacetime, crisis and conflict. This was not merely a pro-industry gesture. It was an admission that commercial capacity has become integral to deterrence and defence.¹⁰

Alliance Persistence Surveillance from Space (APSS) is the clearest expression of this logic. By building a multinational architecture rather than a single NATO-owned fleet, APSS attempts to exploit both national and commercial strengths. The concept is attractive because it reflects the actual geometry of power inside the Alliance: distributed ownership, uneven budgets, and a desire to avoid the political friction of creating a fully collective military constellation. It also has strong operational logic. A federated architecture can be more resilient than a small centralised fleet if it is well integrated and if release mechanisms are pre-arranged.

Yet hybrid architectures are not inherently stable. They depend on interoperability standards, trusted interfaces, contractual continuity, cyber resilience, and a shared understanding of priority use. They also depend on the willingness of commercial actors to remain in the fight. During a crisis, the same features that make commercial firms attractive – agility, market responsiveness, global customer portfolios – can also become vulnerabilities. Firms may face legal ambiguity, insurance constraints, investor pressure, or direct hostile action. In other words, NATO’s embrace of commercial space increases capability while importing new categories of fragility.

¹⁰ NATO ACT 2025.

This is where the phrase ‘commercial–military fusion’ requires careful use. In the Chinese context, it is often understood as a state-directed strategy. In the NATO context, the equivalent process is looser, more contractual, and more politically decentralised. But the practical effect is similar: military effectiveness increasingly depends on systems that are not exclusively military. This creates benefits in scale and innovation but complications in escalation management. A commercial provider delivering data to Alliance users may, in adversary eyes, become a legitimate target of cyber or electronic attack. The line between civilian and military infrastructure, therefore, becomes operationally thinner even if legally it remains debated.

National Reconnaissance Office¹¹ (hereinafter: NRO) developments during 2025 and early 2026 reinforce this trend from the U.S. side. Official statements highlighted efforts to integrate government and commercial detections through data fusion, automation, AI-enabled object curation, and broader commercial acquisition approaches, including multi-phenomenology remote sensing. These developments are directly relevant to NATO because they reveal the direction of travel for the most capable Ally: not replacing national technical means with commercial services but fusing them into layered intelligence architectures.¹²

For NATO, the lesson is not simply ‘buy more commercial data’. It is ‘design for hybrid resilience’. That means redundancy in providers, common standards, legal frameworks for assured service, integration of commercial outputs into military TCPED chains, and exercises that treat loss of commercial services as a real wartime problem rather than a procurement inconvenience. Hybrid architectures are now the operational baseline. The question is whether NATO will master them on its own terms or merely depend on the fact that others already have.¹³

¹¹ The National Reconnaissance Office is a highly classified U.S. government organisation responsible amongst other missions for Space Based ISR.

¹² National Reconnaissance Office 2025a.

¹³ NCIA 2025.

UKRAINE AND THE OPERATIONAL LESSONS OF SPACE-ENABLED WAR

The war in Ukraine forced a strategic correction in how many Western institutions understand the military value of outer space. Before 2022, it was still possible in some policy circles to speak about space mainly in terms of strategic enablers and high-level national assets. Since then, the reality has become much more concrete. Commercial satellite communications, persistent imagery, rapid geolocation, open-source fusion, and the blending of civil and military data pathways have shown that space is not a distant backdrop. It is woven directly into tactical endurance, operational tempo and strategic narrative competition.

One of the clearest lessons is the centrality of resilient communications. The war showed how space-enabled communications can preserve command continuity under conditions of infrastructure damage and electronic contestation. This did not make terrestrial networks irrelevant, but it demonstrated that resilient distributed access can offset attacks on traditional communications architecture. For NATO planners, the implication is obvious: communications resilience can no longer be treated as a separate support problem. It is a warfighting design issue.¹⁴

A second lesson concerns the speed of ISR exploitation. Commercial imagery providers and associated analytics ecosystems enabled high-frequency observation, rapid public release and operationally meaningful awareness. This mattered not only for targeting and battle damage assessment, but for strategic messaging and coalition cohesion. The ability to document movement, damage and pattern change at speed altered the informational battlespace. In this sense, space-based ISR in the Ukraine war was not just an intelligence function. It was also a political and cognitive instrument.

Third, the conflict highlighted the importance of data fusion. No single sensor class was enough. Value emerged from combining imagery, signals, open-source reporting, environmental data, geolocation and operational context. The decisive actor was not the one with the single best image but

¹⁴ DAVIS 2025.

the one able to convert multi-source inputs into timely decisions. This matters for NATO because alliance structures often struggle with data sharing, releasability, and classification barriers even when raw access exists. A virtual constellation without fast fusion is not an operational advantage; it is just a large backlog.¹⁵

Fourth, the war normalised the idea that space-enabled systems will be contested through non-kinetic means long before any overt anti-satellite strike. Cyber intrusion, jamming, spoofing, and interference proved strategically relevant because they impose friction without necessarily triggering immediate escalation to the level associated with kinetic attacks on orbiting objects. This has two implications. It makes the legal debate harder, because interference may remain ambiguous. And it makes operational resilience more urgent, because the most likely losses in early phases may be degradations rather than spectacular destruction.

Fifth, the conflict illustrated the value of proliferated architectures. A larger, more distributed set of nodes is generally harder to suppress than a small number of exquisite assets. This is one reason Proliferated Low Earth Orbit constellation (hereinafter: pLEO) and Tactical Surveillance, Reconnaissance and Tracking (hereinafter: TacSRT) concepts have gained such traction. Timeliness is no longer a luxury add-on; it is the core requirement. Tactical users increasingly expect strategic sources to feed tactical timelines. That expectation changes the meaning of military utility in space systems.¹⁶

For NATO, the deeper lesson is uncomfortable. The alliance benefited intellectually from the operational proof offered by Ukraine, but it did not own the ecosystem that made much of that proof possible. The models that emerged most clearly were hybrid, commercially enriched and often American-backed. NATO therefore faces a choice: codify these lessons into alliance-wide capability development, procurement reform and doctrine, or remain dependent on ad hoc adaptation every time a crisis forces the issue.¹⁷

¹⁵ NATO 2026c.

¹⁶ National Reconnaissance Office 2025b.

¹⁷ NATO 2026b.

LEGAL ARCHITECTURE: ENDURING
FOUNDATIONS, OPERATIONAL INSUFFICIENCY

International space law still matters. Any serious military analysis that dismisses it entirely is intellectually lazy. The Outer Space Treaty remains foundational in at least four respects relevant to NATO. First, it establishes that outer space is not subject to national appropriation. Second, it prohibits the placement in orbit of nuclear weapons and other weapons of mass destruction. Third, it imposes international responsibility on states for their national activities in outer space, including those carried out by non-governmental entities, subject to authorisation and continuous supervision. Fourth, it establishes a broad due regard framework under which states should avoid harmful interference and consult where appropriate.¹⁸ The Liability Convention and Registration Convention then add important layers regarding damage and the identification of space objects.

These principles still frame responsible behaviour and are not obsolete. The problem is that they are operationally insufficient for the strategic conditions now emerging. The treaty regime was built for an era in which states were the dominant actors, commercial activity was limited, and the most feared space threat was nuclear escalation and its impact on strategic stability. Today's military space competition includes dual-use mega constellations, radio-frequency sensing by private firms, cyber operations against ground segments, rendezvous and proximity operations, on-orbit servicing technologies with counterspace implications, and increasingly the use of commercial and civil assets as part of military kill webs. The law provides broad principles, but not detailed operational rules for this environment.

Article IV of the Outer Space Treaty is the most cited example. It is important, but narrow. It addresses WMD in orbit and military activity on celestial bodies.¹⁹ It does not prohibit many forms of counterspace activity that would be decisive in real conflict, such as cyber intrusion into control systems, jamming, dazzling, co-orbital interference below certain thresholds, or the exploitation of dual-use servicing systems for coercive

¹⁸ Outer Space Treaty, Articles II, IV, VI, IX.

¹⁹ Outer Space Treaty, Article IV.

proximity operations. The Outer Space Treaty does not cover suborbital weapons, such as ASAT weapons. As a result, states and alliances can remain formally committed to the treaty while preparing for or engaging in a wide range of competitive behaviours that materially affect military outcomes.

Article VI is equally important to the NATO–commercial discussion. Because states bear international responsibility for national activities in outer space, the increasing military reliance on commercial providers does not remove the state from the legal equation. On the contrary, it intensifies the problem of state supervision. If a commercial provider supplies data or services integral to military operations, states cannot credibly pretend the activity sits outside strategic accountability. The law recognises responsibility, but enforcement remains weak and interpretation contested.

Article IX, with its due regard language and consultation mechanism, is admirable but limited in a crisis. Consultation is useful when the parties value deconfliction and time exists for diplomacy. It is much less useful as an operational brake during fast-moving conflict, especially where attribution is disputed, or interference is reversible and deniable. The law here reveals its core character: it can shape expectations and support post hoc political judgment, but it rarely constrains urgent military adaptation in real time.

This is why current debates in the United Nations (Conference on Disarmament, PAROS²⁰) on proposals aiming the adoption of a binding treaty (Russia and China) vs. non-binding instruments (the U.K., USA) remain important but does not promise any solution in the near future. The 2024 Group of Governmental Experts work showed that discussion continues and that consensus on at least some practical measures is still possible. But discussion is not deterrence, and process is not enforcement. NATO, therefore, operates in a space legal order that remains normatively relevant yet strategically permissive. That is the essence of the gap between legal architecture and realpolitik.²¹

²⁰ Prevention of an Arms Race in Outer Space.

²¹ UN GGE on PAROS 2024.

WHY LAW ALONE WILL NOT SAVE NATO:
DUAL USE, AMBIGUITY AND ESCALATION

The most serious legal-strategic challenge for NATO is not the absence of law, but the dominance of ambiguity. Space systems are often dual-use by design. A satellite that supports agriculture, disaster response and climate monitoring may also provide militarily relevant imagery or communications. A servicing vehicle may support debris mitigation or inspection, but also present latent counterspace potential. A commercial analytics firm may brief civilian customers while also feeding military users. This ambiguity is not a loophole at the margins. It is now the structural condition of the domain.

For NATO, dual-use ambiguity creates at least three problems. First, it complicates deterrence messaging. It is harder to signal which attacks or interferences would trigger a political response when the affected system serves both civilian and military functions. Second, it complicates escalation control. If an adversary interferes with a commercial platform supporting military operations, the legal status of the act may be debated even while its operational significance is obvious. Third, it complicates procurement and doctrine. Alliances like NATO often prefer neat categories – civilian, military, national, commercial – but the systems that matter increasingly refuse those categories.

This is one reason why the rhetoric of ‘peaceful uses’ can become analytically misleading if handled carelessly. In space law, ‘peaceful’ has never simply meant ‘non-military’. It has generally been interpreted as ‘non-aggressive’, which leaves broad room for military support activities. But in public debate, the term often creates the impression that space can be kept separate from terrestrial power politics through legal reaffirmation alone. That is no longer credible. Space is already embedded in terrestrial military competition. The question is whether institutions can manage that embedding without strategic self-deception.²²

NATO should therefore resist two opposite mistakes. The first is legal romanticism: acting as though broader principles can substitute for

²² EVROUX 2025.

preparation in contested domains. The second is legal nihilism: treating norms as irrelevant because enforcement is weak. Both errors are dangerous. Romanticism underprepares. Nihilism invites reckless escalation and undermines alliance legitimacy. The better position is hard realism anchored in law: recognise the continued value of the legal framework while designing doctrine, procurement and resilience measures for a domain where adversaries will aggressively exploit ambiguity.

This has direct implications for alliance planning. Commercial service continuity clauses, crisis release authorities, thresholds for interference reporting, protocols for attribution support, and common understandings of what constitutes unacceptable disruption all become more important than abstract rhetorical unity. The future of NATO space policy will be shaped less by whether it can recite the legal principles and more by whether it can operationalise them under stress.

STRATEGIC DARWINISM: THE REAL LOGIC OF COMPETITION IN ORBIT

The phrase ‘strategic Darwinism’ is intentionally provocative, but analytically useful. It captures the fact that the space domain now rewards adaptation more than doctrinal elegance. The winners in this environment are not necessarily those with the most impressive declaratory policy, but those that can absorb shocks, integrate commercial innovation, retask sensors quickly, maintain mission assurance under interference, and move information into decisions faster than competitors. Survival and advantage go to the actor best fitted to a turbulent environment.²³

In this sense, today’s military space ecosystem resembles a strategic gold rush. States and firms are racing to secure orbital presence, data advantage, launch resilience, and enduring contractual positions inside government security architectures. The incentives are powerful: first-mover advantage in proliferated architectures, data accumulation effects, and institutional

²³ United States Space Command 2025.

lock-in through services that become too operationally useful to replace. NATO, as an alliance built on consultation, interoperability and political consensus, sits uneasily inside this ecosystem. It needs the outputs of the gold rush but is structurally slower at shaping its direction.²⁴

There is also an intra-alliance dimension to strategic Darwinism. The United States tends to emphasise warfighting integration, command-and-control resilience and rapid commercial adaptation. Many European Allies place greater emphasis on regulation, industrial policy, sovereignty debates and risk management. None of these instincts is irrational. But the mix can produce paralysis when the strategic environment demands acceleration. One camp worries about dependence on the U.S. and commercial actors; another worries that overregulation or excessive deliberation will leave NATO dangerously slow. Both concerns are valid, which is precisely why the Alliance often defaults to lowest-common-denominator language.

Industry has its own logic. Commercial space firms need predictable contracts, manageable liability, stable access to classified interfaces where needed, and rules that do not trap them between national export controls and alliance requirements. Their innovation cycles are faster than military procurement cycles, and they know it. NATO's Commercial Space Strategy implicitly acknowledges this by promising to cut red tape and make engagement easier. But red tape is not just an inconvenience. It is often the bureaucratic expression of unresolved political questions: who is allowed in, under what conditions, carrying what risks, for whose missions?

If NATO fails to answer those questions, strategic Darwinism will continue to surround it rather than flow through it. The Alliance will then behave like a consumer of adaptation rather than a driver of it. That may suffice for some contingencies, but not for long-term deterrence in a domain where perception of speed matters. Competitors watch not only what hardware an alliance possesses, but how quickly it can reorganise that hardware and its supporting contracts under pressure.

The provocative conclusion is that NATO may need to become institutionally less comfortable in order to remain strategically relevant. That does

²⁴ NATO ACT 2025.

not mean abandoning the law or the alliance process. It means accepting that the orbit is not a seminar room. In a contested domain, prudence must include speed, and legitimacy must include the ability to sustain access under attack.²⁵

CAPABILITY GAPS, EUROPEAN LIMITS AND THE ILLUSION OF ALLIANCE SUFFICIENCY

NATO's capability gaps in space are often described in technical language, but their root causes are political, industrial and organisational. The first gap is sovereign persistence. NATO still lacks an owned, alliance-controlled layer of persistent space-based ISR with sufficient depth to reduce reliance on nationally retained assets. APSS improves access, but it does not erase this structural gap. The second gap is decision speed. Even when data exists, alliance mechanisms for release, fusion and operational integration can be slower than the timelines demanded by modern warfighting. The third gap is the assurance of commercial continuity. NATO is becoming more dependent on commercial services without yet possessing a fully mature alliance framework for guaranteed wartime access, substitution and resilience under pressure.²⁶

A fourth gap lies in the ground segment and the human layer. Space capability is too often discussed as satellites alone. In reality, advantage depends on ground architecture, cybersecurity, data standards, mission applications, analysts, legal advisers, planners and trained end users able to exploit products fast. A satellite without an integrated user ecosystem is a prestige object, not a warfighting tool. This point matters especially for smaller Allies seeking sovereign or quasi-sovereign capabilities. A national satellite programme without parallel investment in software, doctrine, training, and dissemination pathways risks producing symbolic sovereignty rather than operational effect.

²⁵ NATO 2026b.

²⁶ NATO 2026d.

European debates about ‘strategic autonomy’ intersect awkwardly with this reality. There is a legitimate political desire in Europe to reduce dependence and strengthen sovereign capacity. Yet budgets, duplication concerns, industrial fragmentation, and varying threat perceptions make rapid consolidation difficult. The result is a recurring pattern: Europe acknowledges the problem, creates selective programmes, and still depends on U.S. backbone functions in the moments that matter most. This does not mean European investment is futile. It means that rhetoric must be disciplined by operational honesty.²⁷

NATO also faces a doctrine gap. It has become easier to say that space is a domain than to explain how alliance commanders should think about the offensive and defensive implications within it. Public NATO language tends to remain cautious, which is politically understandable. Yet a doctrine built entirely around support functions can become detached from the strategic behaviour of adversaries who do not share that caution. Even if NATO avoids provocative declaratory language, it still needs internal concepts for operating when access is degraded, for coordinating responses to interference, and for integrating space denial scenarios into joint planning.

The largest illusion is alliance sufficiency by aggregation. It is tempting to believe that because allies collectively own many relevant assets, NATO as an alliance is therefore sufficiently equipped. This confuses inventory with availability. What matters in a crisis is not the total number of allied sensors in existence, but what can be released, fused, tasked and sustained for a NATO mission at the required speed. Aggregation without assured usability is not sufficient. It is potential energy that may or may not convert into operational work.²⁸

²⁷ United States Space Command 2025b.

²⁸ NATO 2026c.

THE NEXT DECADE: PLEO, TACSRT, AI AND
THE MILITARISATION OF TIMELINESS

The future of alliance military space activity will be shaped less by abstract debates about ‘space importance’ and more by four concrete trends: proliferated low Earth orbit architectures, tactically responsive surveillance and tracking, artificial intelligence-enabled processing, and the further erosion of the boundary between national and commercial layers.

The first trend is pLEO. Larger proliferated constellations promise resilience through numbers, more frequent revisit, and a lower penalty for the loss of individual nodes. This does not make them invulnerable. It changes the calculus of suppression. Instead of a few exquisite systems whose loss would be dramatic, militaries will increasingly rely on distributed architectures that can degrade gracefully. For NATO, this trend is attractive because it aligns with alliance logic: distributed burden-sharing and layered access. But it will only generate value if data architectures, processing standards, and release mechanisms are equally distributed and mature.²⁹

The second trend is TacSRT. Tactical users increasingly demand strategic collection with tactical latency. That demand is reshaping what counts as relevant space support. In previous eras, strategic intelligence timelines could remain partly detached from frontline decision cycles. That is no longer sufficient. A surveillance system that is technically impressive but too slow to support tactical manoeuvre will be politically harder to justify. This is why timeliness is becoming militarised. Speed itself is now a key operational parameter, not an optional performance enhancer.

The third trend is AI-enabled processing and fusion. Official U.S. Space Force and NRO materials from 2025 stressed data-driven and AI-enabled force development, automated curation, and the integration of government, commercial and tactical detections. The significance for NATO is not fashionable technology language. It is workforce mathematics. The amount of available data is rising faster than the number of highly trained analysts. AI tools will therefore become increasingly necessary for triage, anomaly

²⁹ NATO 2026d.

detection, pattern recognition and prioritisation. The challenge will be to integrate them without creating black box dependence or degrading trust in military analysis.³⁰

The fourth trend is stealth, manoeuvre, and on-orbit competition below the level of open hostilities. As more satellites acquire manoeuvrability and proximity operations become more common, ambiguity will increase. Inspection, servicing, escort, interference, and coercion may blur into one another. NATO will need better space domain awareness, not just to know what exists in orbit, but to interpret behaviour and intent in time to matter. This again reinforces the value of hybrid architectures and commercial augmentation, as well as the need for trusted analytic frameworks.

Taken together, these trends suggest that the next decade will reward those who can connect collection to decision at machine-assisted speed while preserving political control and legal accountability. NATO's challenge is not to copy the U.S. model mechanically, nor to retreat into legal nostalgia, but to build an alliance-appropriate version of resilient, hybrid, data-intensive military space power.³¹

RECOMMENDATIONS: FROM COORDINATION ALLIANCE TO CREDIBLE SPACE ACTOR

A serious recommendations section must begin with realism. NATO is unlikely in the near term to become a classic sovereign space power with large alliance-owned constellations across every mission area. The political and budgetary barriers are too high. But that does not mean the Alliance must accept drift. It can become a more credible military space actor through targeted reforms that reduce vulnerability and improve decision speed.

First, NATO should treat APSS not as a one-off achievement but as the foundation of a broader alliance surveillance architecture. This means expanding participating states where feasible, hardening the data ecosystem around Aquila, improving operational interfaces with JISR processes,

³⁰ United States Space Force 2025a.

³¹ National Reconnaissance Office 2026.

and exercising degraded-mode operations regularly. APSS should be the beginning of alliance space persistence, not a symbolic endpoint.³²

Second, NATO should institutionalise commercial integration in peacetime so that wartime access is not improvised. That requires framework contracts, substitution mechanisms, common security and cyber requirements, and procedures for priority support in a crisis. The Commercial Space Strategy is useful only if translated into acquisition pathways and exercised relationships. A strategy without contracts is a brochure.

Third, the Alliance should reduce release latency. Data that arrives too late is strategically equivalent to data never collected. NATO, therefore, needs standing rules, common formats, and mission-tailored releasability solutions that move the problem upstream instead of forcing ad hoc negotiations during a crisis. This is less glamorous than new satellites, but often more decisive.

Fourth, Allies seeking sovereign national space capabilities should be encouraged to design them for alliance interoperability from the beginning. Small and medium powers can contribute meaningfully if their systems feed common architectures, use compatible standards, and are matched by investment in exploitation and training. Satellites alone do not create alliance value; integrated users do.

Fifth, NATO should develop a more explicit internal doctrine for operating under space degradation. Public messaging can remain measured, but internal planning must assume interference, denial, deception, and rapid service substitution as normal conditions in major conflict. The goal is not to militarise rhetoric for its own sake. It is to stop assuming benign access in a domain no longer benign.

Sixth, the Alliance should deepen links between legal advisers, operators and commercial providers. The pace of operational adaptation in the space domain means legal questions cannot be postponed to ex post review. They must inform procurement, design, contingency planning and escalation management in advance. Hard realism anchored in law requires institutional intimacy between those communities.

³² NATO 2026d.

Finally, NATO should decide what kind of space actor it wants to be by 2030. If the answer is ‘coordinator’, then resources and expectations should be aligned honestly with that role. If the answer is ‘credible military space actor’, then the Alliance must accept that credibility in space requires not just policy statements but persistent architectures, faster acquisition, hybrid resilience and a doctrine built for contested access.³³

CONCLUSION

NATO’s military space journey has reached the point at which polite ambiguity is no longer enough. The Alliance has recognised the domain, established structures, launched important multinational initiatives, and moved toward deeper commercial integration. These are real achievements. But they do not change the underlying strategic fact that NATO still depends on national and commercial actors for many of the capabilities that would decide operational success in a crisis. That dependency is not shameful; it is simply dangerous if misdescribed.

The core argument of this chapter is therefore straightforward. NATO’s challenge is not whether to choose law or power, legality or utility, norms or warfighting. It must do all of them at once. The legal architecture remains indispensable as a source of legitimacy, state responsibility and strategic restraint. But legal architecture alone cannot compensate for slow procurement, fragmented ownership, delayed release, fragile commercial dependencies, or inadequate doctrine for contested access. Realpolitik, in this context, does not mean abandoning principles. It means acknowledging that the space domain is already competitive, already hybrid, and already central to terrestrial military outcomes.³⁴

If NATO does nothing more than celebrate strategy releases and organisational milestones, it will become an alliance that understands space conceptually while depending on others to make space matter operationally. If, however, it builds on APSS, hardens commercial integration, reduces

³³ NATO 2025.

³⁴ NATO 2026b.

release latency, invests in interoperable allied contributions, and prepares seriously for degraded access, it can become something more consequential: not a replica of a nation state space force, but a credible alliance actor capable of converting distributed strengths into military effect.³⁵

The decisive question is therefore not whether NATO “has a space policy”. It does. The decisive question is whether it can turn policy into resilient, timely, and politically usable space power before competitors widen the gap further. In orbit, as in strategy, adaptation favours the prepared.³⁶

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³⁵ NATO 2025.

³⁶ NATO ACT 2025.

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Justine Dousset

LEGAL QUESTIONS RELATED TO THE EU'S
SATELLITES AS TARGETS OR TOOLS IN
AN INTERNATIONAL ARMED CONFLICT

INTRODUCTION

The use of satellites in armed conflicts has become increasingly indispensable.¹ Space-based technologies are now integral to modern warfare, providing critical capabilities such as remote sensing, signals intelligence, secure communications, Earth observation and precise navigation and timing. These systems enable commanders to maintain real-time situational awareness and coordinate operations across multiple theatres simultaneously. Since the First Gulf War, military dependence on such capabilities has grown steadily, making satellites not merely useful tools but essential infrastructure, and, inevitably, prime targets for adversaries with diverse and often hostile intentions.² As critical infrastructures, space assets become objects of aggression in armed conflict, targeted to destabilise or weaken an adversary's capabilities. This reality was vividly illustrated by the Russian invasion of Ukraine in February 2022, when one of the first acts of war was a cyberattack on ViaSat's KA-SAT network.³ This incident exposed both the vulnerability of space infrastructures and their critical importance in contemporary warfare.⁴

The growing strategic importance of satellites in armed conflicts raises fundamental legal questions about the characterisation of hostile actions under international humanitarian law. The space environment presents a distinctive legal challenge: determining whether specific actions constitute

¹ As evidenced by the collective contributions presented in this volume.

² BATAILLE-MESSINA 2020.

³ POIRIER 2022.

⁴ Council of the European Union 2022a.

an ‘armed aggression’ under the UN Resolution 3314,⁵ an ‘armed attack’ under Article 51 of the UN Charter⁶ or cross the threshold of prohibited force under Article 2(4)⁷ proves exceptionally difficult. Hostile actions in outer space typically manifest not as conventional kinetic attacks but rather as radio-frequency interference, simulated accidents, directed-energy operations, or unauthorised orbital manoeuvres, actions that require no conventional weaponry and leave limited forensic traces. Consequently, such actions occupy an indeterminate ‘grey zone’ between peacetime competition and armed conflict, the legal characterisation of which remains deeply contested. The extant framework governing international armed conflict appears inadequately equipped, if not obsolete, in addressing this spatial dimension.

The international community has acknowledged this governance gap. The Open-ended Working Group on the Prevention of an Arms Race in Outer Space in all its aspects⁸ (OEWG PAROS) (2025–2028) was established to develop possible norms, rules and principles of responsible behaviour in the space domain, thereby addressing the legal ambiguities inherent in characterising hostile space operations. A significant shift has occurred in legal analysis: rather than attempting to characterise whether a given space action constitutes an “armed attack” or prohibited force, emphasis has increasingly turned towards assessing the intent and behaviour of the acting

⁵ UN Doc. A/Res/3314 (XXIX), Annex Definition of Aggression, Preamble, para. 5.

⁶ As a reminder, Article 51 of the UN Charter states: “Nothing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security. Measures taken by Members in the exercise of this right of self-defence shall be immediately reported to the Security Council and shall not in any way affect the authority and responsibility of the Security Council under the present Charter to take at any time such action as it deems necessary in order to maintain or restore international peace and security.”

⁷ Article 2(4) of the UN Charter states: “All Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations.”

⁸ UN Doc. A/Dec/79/512.

State, recognising that traditional thresholds of armed conflict may prove inadequate as analytical tools. Whilst the present analysis acknowledges this fundamental legal difficulty, the scope of the present chapter does not extend to resolving the question of act characterisation. Instead, the discussion proceeds from a distinctly European perspective,⁹ examining how the Union and its Member States may lawfully employ or protect space assets in contexts where armed conflict is at play.

For decades in Europe, the space domain had been regarded primarily through its societal, economic and scientific dimensions.¹⁰ The European Union (EU) was slow to acknowledge space as a sector of strategic relevance, as it possessed no formal competence in this field before the entry into force of the Treaty of Lisbon.¹¹ A similar situation prevailed within the European Space Agency (ESA), an intergovernmental organisation independent from the Union, whose mandate remains limited to the promotion of exclusively civilian space activities.¹²

However, over the past decade, this perception has been shifting profoundly.¹³ Starting in 2016 with the Space Strategy for Europe, which acknowledged the need to strengthen synergies between civil and security uses of space,¹⁴ this position was reinforced by the 2022 Strategic Compass for Security and Defence, which explicitly identified outer space as a contested domain of strategic significance alongside the high seas, air and cyberspace.¹⁵ These political documents reflect a progressive recognition that Europe's security and defence interests are tied to its space infrastructures.

The adoption in 2023 of the EU Space Strategy for Security and Defence (EUSSSD)¹⁶ represents the culmination of this evolution. The EUSSSD

⁹ For an analysis of the EU's role within the OEWG PAROS see BATAILLE 2025.

¹⁰ DE NEVE 2024.

¹¹ Its competence in the space sector was formally recognised with the Treaty of Lisbon and Article 189 of the Treaty on the Functioning of the European Union.

¹² ESA Convention, Article II.

¹³ ARADI 2024.

¹⁴ European Commission 2016: 10.

¹⁵ Council of the European Union 2022b.

¹⁶ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023.

formally enshrines the space and defence nexus, stating that “space is critical for the strategic autonomy of the EU and its Member States”.¹⁷ It affirms, on the one hand, the need to ensure security in space, conceived as the protection of European space assets against hostile acts, and, on the other, the objective of harnessing space for security and defence¹⁸ by enabling the operational use of EU satellites in support of civilian missions and military operations, in accordance with international law.¹⁹ This position was recently reaffirmed in the European Preparedness Union Strategy.²⁰

In view of this evolution, and of the Union’s explicit recognition of both security in space and space for security and defence, EU-owned satellites must now be understood as occupying an inherently ambiguous and increasingly exposed position. As dual-use infrastructures designed to serve civilian needs while simultaneously supporting defence and security objectives, they raise complex legal questions when employed in situations of international armed conflict. Their operational use by the EU and its Member States may qualify them as *tools* of warfare, while at the same time exposing them to being treated as potential *targets* of hostile action due to their perceived military value. These two hypotheses structure the present chapter: the first section examines the legal framework applicable to EU-owned satellites when used as *tools* in an armed conflict, while the second turns to the regime governing their potential qualification and treatment as *targets* in such a conflict.

Although the EUSSSD adopts a broad understanding of the space domain, encompassing not only orbital infrastructures but also ground stations, radio-frequency links, user terminals, and the associated cyber

¹⁷ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 1.

¹⁸ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 10–14; DARNIS–VECLANI 2011.

¹⁹ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023.

²⁰ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023a.

and industrial components that sustain them,²¹ the present chapter adopts a narrower focus. For the purposes of the analysis that follows, attention will be confined to satellites alone,²² and “EU-owned satellites” will be understood as those space systems that form integral components of the EU Space Programme as established by Regulation (EU) 2021/696.²³ This regulatory framework consolidates the Union’s space activities under a unified governance structure. It demonstrates that the EU is the owner of all tangible and intangible assets created or developed under the programme’s components.²⁴ The programme encompasses four primary components: Galileo,²⁵ Copernicus,²⁶ the EU Governmental Satellite Communications (GOVSATCOM),²⁷ and the Infrastructure for Resilience, Interconnectivity and Security by Satellite (IRIS²),²⁸ and support services such as the European Union Satellite Centre (SatCen) and the EU Space Surveillance and Tracking Partnership (EU SST).

²¹ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 2.

²² This focus reflects the research framework of the present volume, *Legal and Policy Aspects of the Use of Satellites in Armed Conflicts*, which is specifically concerned with the legal status and uses of satellites, rather than with space infrastructures in a broader sense.

²³ Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme and repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU, OJ L 170/69, 12.5.2021.

²⁴ Regulation (EU) 2021/696, Article 9.

²⁵ Galileo is the EU’s global navigation satellite system, providing autonomous positioning, navigation and timing services.

²⁶ Copernicus is the EU’s Earth observation programme, providing environmental and security-related data.

²⁷ GOVSATCOM is a programme that aims to provide secure, resilient and cost-efficient satellite communications for critical missions and governmental operations.

²⁸ IRIS² is the EU’s initiative for secure satellite communication, enhancing connectivity and resilience.

EU-OWNED SATELLITES AS TOOLS
IN AN ARMED CONFLICT

In light of the preceding introduction, it must be concluded that the Union has expressly accepted that its satellite systems may be used for security and defence purposes. The EUSSSD reflects a clear policy choice to enable EU space programmes to support defence-related activities, notwithstanding their formally civilian designation. This is evidenced by the explicit anticipation of special regimes governing the provision of sensitive services and data to defence users, including differentiated access rights, operational safeguards and restrictions on dissemination, particularly in military contexts.²⁹ Such measures are incompatible with the notion that any military use of EU satellite assets would be merely subsidiary or exceptional. On the contrary, the Strategy affirms that defence and security requirements are to be integrated directly into the technical architecture of both future and existing EU space systems, noting that “the Commission will embed military and security user requirements in the design of relevant new EU space systems and the upgrade of relevant existing systems”.³⁰ This promotion of dual-use by design is also advanced in the European Preparedness Union Strategy.³¹ From an institutional perspective, EU space capabilities have now been incorporated into defence planning frameworks, with defence interests represented throughout EU space governance structures. Taken together, these developments demonstrate that the military use of EU space assets is not a contingent by-product of civilian programmes, but a foreseeable, authorised and institutionally prepared use, endorsed at both policy and structural levels of the Union.³²

²⁹ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 10.

³⁰ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 10.

³¹ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023a: 13.

³² Council of the European Union 2022b: 31–32; European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 5–10.

This dual-use orientation is particularly evident in the Union's flagship constellations, Galileo, Copernicus and the forthcoming IRIS², all of which are explicitly associated with security and defence applications. Galileo offers a Public Regulated Service (PRS) restricted to government-authorised users and intended for sensitive applications requiring a high level of service continuity,³³ a capability described as a "critical enabler for military operations".³⁴ Copernicus, initially conceived under the name GMES (Global Monitoring for Environment and Security),³⁵ was from the outset designed to provide security-related services. Its data have already proved operationally useful to the Ukrainian armed forces.³⁶ However, it was not tailored initially to specific defence requirements, which explains the current efforts to establish an EU Earth Observation Governmental Service (EOGS)³⁷ for government-authorised users to support security and defence decision-making.³⁸ Sensitive geospatial intelligence products derived from Copernicus data are processed and disseminated through the SatCen, whose role has expanded significantly in support of Common Security and Defence Policy (CSDP) missions and the Member States' military operations.³⁹

³³ Decision No 1104/2011/EU of the European Parliament and of the Council of 25 October 2011 on the rules for access to the public regulated service provided by the global navigation satellite system established under the Galileo programme, OJ L 287/1, 4.11.2011.

³⁴ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 10.

³⁵ Regulation (EU) 911/2010 of the European Parliament and of the Council of 22 September 2010 on the European Earth monitoring programme (GMES) and its initial operations (2011 to 2013) Text with EEA relevance, OJ L 276, 20.10.2010.

³⁶ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 11.

³⁷ European Commission 2025a; European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 11.

³⁸ European Commission 2024.

³⁹ European Union Satellite Centre 2025.

In parallel, GOVSATCOM⁴⁰ and IRIS²⁴¹ constellations are being developed with explicit provisions for secure military communications. The security and defence dimension of these assets has been publicly reaffirmed by the High Representative for Foreign Affairs and Security Policy and Vice President (HR/VP), who stated that European satellites “serve our military missions on the ground”, thereby acknowledging that space systems provide operational support to armed forces.⁴² In the same vein, the latest annual report on the implementation of the CSDP highlights the need to further develop the European Space Programme in light of the strong connections between the space and the defence and security sectors when preparing the new Multiannual Financial Framework (MFF).⁴³ This orientation is already reflected in the Commission’s proposal for the next MFF, notably through the European Competitiveness Fund, which enables closer alignment between Union space programmes and defence-related funding.⁴⁴

The fact that EU-owned satellites are now politically envisaged as supporting security and defence does not, by itself, settle the legal framework governing their use in an armed conflict. Instead, the applicable legal questions vary depending on which actor employs these satellites in that context. For the Union, as owner of the assets, the primary issue is not how it may use them, but more fundamentally whether it can itself become a party to an armed conflict at all. By contrast, for the Member States, which can undeniably become parties to an armed conflict by virtue of their status under international law, the focus shifts to the legal framework governing their use of EU-owned satellites and the potential consequences that such use may entail.

⁴⁰ European External Action Service 2017.

⁴¹ Regulation (EU) 2023/588 of the European Parliament and of the Council of 15 March 2023 establishing the Union Secure Connectivity Programme for the period 2023–2027, OJ L 79/1, 17.3.2023.

⁴² KALLAS 2025.

⁴³ European Parliament 2024: Point 150.

⁴⁴ European Commission 2025b.

The use by the EU of its satellites as tools in an armed conflict

The question of whether the EU may use its own satellites as tools in an international armed conflict presupposes, as a preliminary matter, an examination of the international organisation's capability to enter an armed conflict.⁴⁵

International organisations as parties to an armed conflict

In contemporary international law, the possibility that an international organisation may become a party to an armed conflict is no longer excluded in principle. The starting point lies in the International Court of Justice's (ICJ) jurisprudence on the legal personality of international organisations. In its Advisory Opinion of 11 April 1949 concerning *Reparation for Injuries Suffered in the Service of the United Nations*, the Court held that the United Nations "was intended to exercise and enjoy, and is in fact exercising and enjoying, functions and rights, which can only be explained based on the possession of a large measure of international personality and the capacity to operate upon an international plane".⁴⁶ This Advisory Opinion established that international legal personality is fundamentally contingent upon two essential factors: the existence of autonomous, intrinsic competences vested in the organisation, and the formal recognition of sufficient organisational autonomy to enable the effective exercise of such competences in pursuit of its mandated objectives.⁴⁷

⁴⁵ CLAPP 2023: 1. The European Parliament glossary terms bases its definition of armed conflict on the interpretation of the International Committee of the Red Cross: "An armed conflict is said to exist when there is an armed confrontation between the armed forces of States (international armed conflict), or between governmental authorities and organised armed groups or between such groups within a State (non-international armed conflict). Other situations of violence, such as internal disturbances and tensions, are not considered to be armed conflicts."

⁴⁶ International Court of Justice, *Reparation for Injuries Suffered in the Service of the United Nations*, 9.

⁴⁷ KOLB et al. 2005: 121–122.

At the same time, the Court emphasised that international organisations are entities created by their constitutive instruments and enjoy only attributed competences, those expressly conferred or necessarily implied by their mandates.⁴⁸ Their rights and obligations under international law are thus not general but confined to what is required to attain their functions.⁴⁹ This reasoning has been extended in doctrine and by bodies such as the Institute of International Law⁵⁰ to the field of armed conflict. Where an organisation is entrusted with security functions and possesses the material means to conduct military operations, it may acquire the *ratione personae* capacity to be bound by international humanitarian law (IHL), not through formal Treaty adherence but through customary IHL.⁵¹ Crucially, this capacity depends not on the legality of the resort to force (*jus ad bellum*), but on the factual engagement of organised armed violence reaching the threshold of an armed conflict.⁵²

On this basis, an international organisation may, in principle, qualify as a belligerent where its constitutive instruments entrust it with security or defence functions. This will be the case where, in exercising those functions, it commands organised armed forces and disposes of sufficient material means to conduct military operations of the requisite intensity. Only under such circumstances does it become meaningful to speak of the organisation using its assets, including space systems, as tools of warfare.

The EU's capacity to become a party to an armed conflict

Applied to the EU, this framework requires a careful distinction between international legal personality, on the one hand, and belligerent capacity, on the other. Since the entry into force of the Treaty of Lisbon, the Union

⁴⁸ Confirmed by the International Court of Justice in its 1996 Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons.

⁴⁹ KOLB et al. 2005: 123–125.

⁵⁰ Institute of International Law 1999.

⁵¹ FERRARO 2015: 1232.

⁵² International Committee of the Red Cross 2024: 5–7.

has acquired a whole international legal personality, enabling it to conclude treaties, assume international obligations, and act autonomously on the international plane.⁵³ By analogy to the ICJ's reasoning in the 1949 Reparations Opinion, the EU clearly meets the threshold for international legal personality: it possesses autonomous competences enumerated in its founding Treaties, its institutions display a sufficient degree of formal autonomy, and it constitutes a new legal order capable of producing binding effects independently of its Member States.⁵⁴

Possessing international legal personality does not, however, automatically confer upon the Union the capacity to become a belligerent. As developed above, such a personality operates only within the limits of the competences conferred upon the international organisation by the principle of speciality, and within the EU context, is further constrained by the principle of conferral.⁵⁵ The Union's foundational objectives are centred fundamentally on the proper functioning of the internal market, and whilst the Union has acquired specific competences in security and defence matters through the CSDP framework, these remain distinctly circumscribed.⁵⁶

CSDP missions include both military and civilian operations.⁵⁷ Nonetheless, the presence of military operations does not automatically mean that CSDP forces are involved in an armed conflict. Even in regions experiencing armed conflict, the presence of international forces does not inherently make them participants in the conflict.⁵⁸ Peace support troops can operate within a host nation engaged in active armed conflict

⁵³ The EU holds observer status with the General Assembly: UN Doc. A/Res/65/276: Participation of the European Union in the work of the United Nations.

⁵⁴ Judgment of the European Court of Justice, *Van Gend & Loos*, Case 26-62 (5 February 1963), para. 3: "The European Economic Community constitutes a new legal order of international law for the benefit of which the States have limited their sovereign rights, albeit within limited fields."

⁵⁵ The Treaty on European Union, Article 5.

⁵⁶ *FALCO* 2009: 175. It is an accepted opinion that the EU's CSDP will not establish an EU army responsible for the defence of the EU Member States.

⁵⁷ European External Action Service 2025a: 1.

⁵⁸ *BOTHE-DORSCHER* 2001: 501–502.

while avoiding engagement in hostilities, especially when their mandate is strictly limited.⁵⁹ Therefore, military operations led by the EU may avoid being classified as belligerent as long as their mandate limits involvement in active conflicts.

The EU's foundational values reinforce this legal circumscription: respect for human dignity, freedom, democracy, equality, the rule of law and human rights,⁶⁰ which are constitutive of its identity and further constrain the manner in which any use of force may be conceived. These values, embedded in the EU's constitutive Treaties, reflect a structural institutional preference for multilateral, law-centred responses rather than unilateral military action, rendering the notion of the EU as an autonomous belligerent fundamentally at odds with its founding Treaties.

This preference is further evidenced by the CSDP's institutional design. Unlike the United Nations (UN) or the North Atlantic Treaty Organisation (NATO), whose founding instruments explicitly identify the maintenance of international peace and security as central objectives and provide for robust military structures, the EU's CSDP⁶¹ is framed primarily in terms of crisis management, peacekeeping and conflict prevention,⁶² rather than for autonomous military action by the Union itself.⁶³ The empirical record confirms this orientation: an analysis of past and ongoing CSDP missions demonstrates that the Union predominantly engages in civilian operations characterised by low-intensity stabilisation and capacity-building activities, rather than in high-intensity military operations associated with belligerent status.⁶⁴

Beyond these institutional and normative constraints, the Union lacks the material means to conduct military operations, as operational capacity is built from civilian and military assets provided by the Member States, which retain sovereign command and control over the

⁵⁹ MURPHY 2003: 154; NAERT 2010: 470.

⁶⁰ The Treaty on European Union, Article 2.

⁶¹ The Treaty on European Union, Articles 21–46.

⁶² The Treaty on European Union, Article 42; European External Action Service 2025a: 1.

⁶³ SUR 2011: 288.

⁶⁴ DARNIS–VECLANI 2011: 3.

deployment, withdrawal and tactical direction of their forces.⁶⁵ This structural dependency on national contributions reveals that the EU lacks the autonomous material capacity to meet the threshold for becoming a party to an armed conflict. Even if EU operations involve a transfer of authority over military contingents, and even if such control is typically regarded under international law as crucial for attribution of conduct,⁶⁶ this principle remains contested.⁶⁷

Furthermore, our analysis must acknowledge a critical caveat. Although EU-led forces have not thus far become engaged in combat as a party to an armed conflict in any of the EU's military operations, the Union does not exclude, where necessary, the use of armed force in the conduct of a mission.⁶⁸ According to the Salamanca Presidency Declaration, "respect for IHL is relevant in EU-led operations when the situation they are operating in constitutes an armed conflict to which the forces are party".⁶⁹ On this reading, the EU accepted that IHL applies when EU-led forces become parties to an armed conflict and thereby acknowledged that those forces can, in principle, acquire such status.⁷⁰ However, even where force is used in self-defence, the law of armed conflict applies only when the force used crosses the threshold of an armed conflict.⁷¹

A related but secondary question merits consideration: might the Union receive authorisation or delegation from the UN Security Council to conduct operations involving the use of force? Whilst theoretically conceivable

⁶⁵ Key decisions for operations under the CSDP are taken by the Council of Ministers of the EU. The Treaty on European Union, Article 42.

⁶⁶ International Law Commission 2011.

⁶⁷ As evidenced by divergent approaches in the International Law Association's final report on the accountability of international organisations of 2004. NAERT 2010: 515–517.

⁶⁸ Council of the European Union 2014: 16.

⁶⁹ A final document of a seminar organised by the Spanish Presidency of the EU, 22–24 April 2002, on the enforcement and application of international law, including IHL, in EU-led operations, in Salamanca, Doc. DIH/Rev.01.Corr1, exposed by NAERT 2011: 233–234.

⁷⁰ NAERT 2011: 233–235; NAERT 2013: 638–641.

⁷¹ NAERT 2010: 472–473.

under Article 53 of the UN Charter,⁷² such delegated authority would not transform the Union into an autonomous belligerent. When the Security Council entrusts the execution of its mandates to regional organisations, such as NATO in the Balkans,⁷³ it grants juridical legitimacy to the use of force whilst retaining primary responsibility for international peace and security. The delegated entity acts as an instrument of the collective security system, not as an independent international subject exercising autonomous belligerent capacity.⁷⁴ Critically, an EU operation conducted pursuant to Security Council authorisation would necessarily be circumscribed by the scope of that mandate. The Union would act not as a *sui generis* belligerent, but as an executive agent implementing a collective decision within parameters defined by the Council. Even where authorisation permits the use of force, the threshold for belligerent status in international humanitarian law remains distinct from mere authorisation to employ military means. Furthermore, to become a belligerent through a Security Council delegation would require a radical departure from the EU's established practice.

Consequently, although the Union's status as a belligerent in armed conflict is not legally precluded in principle, the combination of restrictive legal thresholds and structural safeguards enshrined in the European Treaties makes such a scenario exceptionally unlikely in practice. Should such a situation arise, the range of legal questions that would follow would be significant and would fall outside the scope of the present analysis. However, the use of European satellites in such circumstances should not differ, in principle, from their current use by the Union for security and defence purposes, outside the framework of an armed conflict.

⁷² Article 53 of the UN Charter, which permits the Security Council to utilise regional arrangements for the application of coercive measures under its authority.

⁷³ UN Doc. A/Res/1244 (1999), Resolution 1244 (1999) on the deployment of international civil and security presences in Kosovo.

⁷⁴ BLOKKER 2000.

*The use by the EU of its satellites for
security and defence purposes*

However, the fact that the Union has not yet acquired belligerent status does not preclude it from intervening in security and defence matters, provided that such intervention conforms to international law.⁷⁵ As established above, EU interventions in the security domain have operated primarily through upstream conflict prevention and downstream stabilisation, employing diplomatic engagement, economic measures, security sector reform, civilian missions and limited advisory operations.⁷⁶

Within this operational framework, EU policies have progressively recognised space systems as strategic dual-use infrastructures capable of supporting these security and defence activities. The EU Space Programme now explicitly serves CSDP objectives,⁷⁷ and the Union accordingly utilises its own space systems in support of CSDP missions.⁷⁸ The crisis in Libya in 2011 provides a pertinent illustration of this capacity. Although NATO conducted the primary military intervention, the EU established a parallel military operation, EUFOR Libya, whose mandate was limited to humanitarian stabilisation.⁷⁹ To fulfil this mission, space assets, specifically Copernicus services, were used to provide rapid geospatial intelligence and damage assessment of critical infrastructure, such as airports and seaports.⁸⁰

This practice confirms that whilst the EU itself cannot become a belligerent, it can and does employ its space assets to support broader security and stabilisation activities within its competences. The question that remains is whether, and under what conditions, Member States may themselves rely on these Union space assets in the conduct of their own military operations in armed conflicts.

⁷⁵ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023.

⁷⁶ SUR 2011: 286.

⁷⁷ Regulation (EU) 2021/696, Recitals 79 and 100.

⁷⁸ European Parliament 2024: Point 152.

⁷⁹ Council of the European Union 2011.

⁸⁰ DARNIS-VECLANI 2011: 9–10.

*The use by the Member States of the EU-owned
satellites as tools in an armed conflict*

The capacity of the Member States to engage in international armed conflict is beyond question. Notwithstanding their membership of the Union, they retain their status as sovereign States and, consequently, all prerogatives deriving therefrom under public international law, including the right to resort to armed force within the limits established by the UN Charter. The relevant issue is therefore not whether the Member States may enter into an armed conflict, but rather if once engaged in such a conflict, they may lawfully rely on data and services derived from EU-owned satellite systems.

The prospect of using EU-owned space capabilities for the security and defence needs of the Member States is challenging to contest when examined in light of the Union's own legal instruments. The EU Space Programme expressly lists among its general objectives the aim to "enhance the safety and security of the Union and its Member States",⁸¹ thereby anchoring security and defence-related uses within the very rationale of the Programme. In the same vein, IRIS² is designed to deliver added-value services, such as anonymity of use, low latency and enhanced flexibility, to governmental users,⁸² with Member States exercising effective control through mechanisms comparable to those governing access to Galileo's PRS. It should further be noted that the EUSSTD opens its conclusion by stating that "space systems and services in the EU contribute to the strategic autonomy of the EU and its Member States".

In light of these provisions, the European political and legal framework not only permits but structurally organises the use by Member States of EU-owned satellites and derived services for security and defence purposes, including in the specific context of armed conflict. Accordingly, rather than questioning the permissibility of such uses, the more pertinent analysis is to examine the potential legal consequences that may flow from them for the Union, the other Member States and ESA, particularly about their possible qualification as 'co-parties' to an armed conflict. To that end, the

⁸¹ Regulation (EU) 2021/696, Article 4.

⁸² Regulation (EU) 2023/588, Article 3.

following analysis proceeds in two stages: it first examines the threshold of co-belligerency as it applies to satellite-enabled forms of support in contemporary armed conflict, before turning to the question of attribution of participation in hostilities to the Union, the Member States and the ESA.

The co-party threshold and satellite-enabled support

The central question examined here is whether the use by a Member State of data from European satellites gives rise to legal repercussions for the Union and other Member States, and, more specifically, whether such use would render them 'co-parties'⁸³ to an armed conflict. It must be emphasised at the outset that this question arises principally in relation to access to the secure or restricted components of satellite systems, rather than to publicly available data,⁸⁴ which are already routinely used in armed conflicts without raising issues of third-party involvement.

It must first be established that international law does not clearly define the moment at which a State may be considered to have become a party to an armed conflict, nor does it provide definitive criteria for participation in a pre-existing armed conflict.⁸⁵ This doctrinal lacuna is particularly significant: the threshold at which support provided by one or several States to another in its fight against a common enemy renders the supporting State(s) a party to the armed conflict remains ambiguous.⁸⁶

The prevailing approach in contemporary IHL holds that financing, the provision of equipment (including transfers of arms), the furnishing

⁸³ For the purposes of this analysis, the terms "co-belligerency" and "co-party" are used interchangeably, notwithstanding the substantive doctrinal differences between them, as a detailed examination of these distinctions falls outside the scope of the present inquiry. For the same reason, this analysis will also not tackle the difference between international armed conflict (IAC) and non-international armed conflict (NIAC).

⁸⁴ Programme of the European Union, Copernicus Data Access (<https://www.copernicus.eu/en/access-data>).

⁸⁵ International Criminal Tribunal for the Former Yugoslavia, Prosecutor v. Tadić; GRIGNON 2022: 1.

⁸⁶ WENTKER et al. 2024: 8–10.

of intelligence, and the training of armed forces do not, in themselves, confer the status of co-belligerent.⁸⁷ The decisive criterion is the existence of a direct operational connection to hostile acts and engagement in the planning or supervision of specific military operations.⁸⁸ A broad strand of the doctrine agrees that supplying arms, in and of itself, lacks the requisite direct operational nexus to an international armed conflict to qualify as co-belligerency.⁸⁹ Instead, a State would typically acquire co-belligerent status only through: the use of force against the adversary (for instance, through the establishment of prohibited military zones), the provision of intelligence that forms an integral part of concrete military operations and targeting processes, or the provision of territory as a base for the launching of military operations.⁹⁰

Applied to satellite activities, this suggests that the mere provision or availability of EU satellite data, absent operational integration into specific attack plans, falls short of the co-belligerency threshold, a conclusion reinforced by State practice in which extensive space-based support (encrypted GPS signals for allies, Ukrainian use of Copernicus imagery, Galileo navigation and commercial satellite communications) has not led to the supporting entities being treated as parties to the conflict. This legal framework has been validated by recent international developments. The international community formally recognised the Russian Federation's aggression on Ukraine,⁹¹ affirming its right to self-defence under Article 51 of the UN Charter. Within this context, the provision of EU satellite data and related geospatial intelligence to Ukrainian armed forces exemplifies the permissible scope of such support, through which the Union supports Ukraine in the exercise of its legitimate right to self-defence. Therefore, the assistance of this nature remains compatible with the legal constraints on third-state participation in armed conflict.

⁸⁷ International Committee of the Red Cross 1977, Article 43; WENTKER et al. 2024: 17–21.

⁸⁸ MELZER 2009.

⁸⁹ HELLER–TRABUCCO 2022: 263–265.

⁹⁰ GRIGNON 2022: 2.

⁹¹ UN Doc. A/Res/ES-11/1, Aggression against Ukraine.

*Attribution of conflict participation to
the EU, Member States and ESA*

Against this background, the next step is to assess whether, and under what conditions, the Union, other Member States or ESA might nonetheless incur legal consequences, particularly co-belligerent status, through a Member State's use of EU-operated satellite systems in an armed conflict.

Turning first to the EU itself, before examining whether the provision of satellite data could render the Union a co-party to an armed conflict, it is necessary to recall that, as demonstrated above, the question of whether the EU can itself enter into an armed conflict remains legally unsettled. The prevailing view, however, is that it most certainly will not itself be regarded as a belligerent in the sense of the law of armed conflict, and mere ownership or operation of dual-use infrastructure such as satellite systems does not, in and of itself, amount to participation in an armed conflict. In this respect, the Union's position is closely analogous to that of States hosting undersea communication cables: even though such neutral infrastructure may be intensively used or targeted by belligerents, this does not, in and of itself, render the coastal or territorial State a party to the conflict,⁹² and by the same token the fact that military operations rely on EU satellites does not, by itself, turn the Union into a co-belligerent.

As Member States retain their full sovereignty and status as independent subjects of international law, the threshold articulated above must be applied. Co-belligerency, in the context of international armed conflict, requires both a direct connection to hostilities and a significant degree of operational cooperation with a belligerent State. In this regard, the relevant conduct is the act of the individual State employing satellite-derived data in support of its military operations. That act must be assessed as the act of a State under general international law, not as the act of a "Member State" in its

⁹² HEINTSCHEL VON HEINEGG 2017.

institutional capacity within the Union.⁹³ The sole link to the Union lies in the fact that the data originates from an EU satellite. Still, this technical provenance does not alter the legal classification of the conduct as that of the using State. The provision of satellite data by the Union, particularly when accessed by a Member State through established institutional frameworks with the agreement of all Member States, represents an attenuated form of support that lacks the operational directness required by IHL. In light of these considerations, the prospect that non-participating Member States could incur legal consequences under the law of armed conflict as a result of such indirect involvement appears far-fetched.⁹⁴

A further question arises regarding ESA, which plays an active operational role in the functioning of the Union's satellite systems. However, the practical difficulties of attributing co-belligerent status to ESA are even more pronounced than in the case of the Member States. Not only would there be no rational interest for an adversary State in characterising a technical and scientific organisation as a co-party to a conflict, but such a characterisation would appear conceptually incoherent under the law of armed conflict. ESA possesses neither the legal capacity to wage war nor the political authority to direct military operations; it functions solely as the technical operator of the infrastructure.⁹⁵ Therefore, to attribute belligerent status to such an entity would appear even more far-fetched.

In conclusion, the legal consequences of a Member State's use of EU-operated satellite systems in an armed conflict appear either minimal or non-existent for the Union, the other Member States and ESA, provided such use is consistent with the Member State's obligations under international law. The links connecting these entities to the Member State utilising

⁹³ NAERT 2010: 526. As to the question of the legal consequences for EU Member States engaged in an EU-led operation when that operation becomes a party to a conflict, the prevailing view holds that the Member States do not thereby acquire the status of parties to the conflict. By extension, the utilisation of satellites by the Union or by individual Member States would not, in itself, constitute participation in an armed conflict by the other Member States.

⁹⁴ NAERT 2010: 526.

⁹⁵ ESA Convention, Article II.

satellite data are considerably more attenuated than in other empirical examples that have not, in practice, led to the characterisation of third parties as co-belligerents.

EU-OWNED SATELLITES AS TARGETS IN ARMED CONFLICT

The preceding section established that EU space systems are explicitly designed and operationally employed as military tools. This military use may lead adversaries to regard them as potential targets. The question, therefore, arises: What legal framework governs the EU's and its Member States' response to attacks against EU-owned satellites?

The EU has become acutely conscious of this vulnerability. While the EUSSSD explicitly acknowledges that space assets face diverse and evolving threats,⁹⁶ the Strategic Compass emphasises the greater urgency in addressing hostile acts originating in or directed against outer space.⁹⁷ This recognition reflects the acknowledgement that space is no longer conceived as a sanctuary immune from conflict, but as a contested operational domain where European assets face significant risks.

Whilst the Union does not pursue aggressive or offensive space capabilities, it seeks to prepare itself to defend against attacks, as space systems are essential to European economies and societies.⁹⁸ The EUSSSD stresses that contemporary European societies depend fundamentally upon space services for financial systems, transportation networks, energy grids and military operations. Loss or degradation of these services would produce cascading effects, justifying space infrastructure protection as a core security priority. The Union's approach, therefore, emphasises resilience rather than offensive posturing.

⁹⁶ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023.

⁹⁷ Council of the European Union 2022b.

⁹⁸ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 3.

To address these challenges, the Union has established political coordination and governance processes designed to respond more effectively to space threats and attacks. While the overall model broadly mirrors the approach used for non-space-related threats, its application is considerably more complex due to the specific technical characteristics and cross-domain dependencies of space systems. As with other types of hostile activity, the first step is to detect, characterise and attribute the threat, to enable a timely, proportionate, and coherent response at both national and EU levels.⁹⁹ It is therefore necessary to begin by examining the mechanisms for detection and characterisation that enable attribution, before turning to the question of response.

*From technical detection and
characterisation to legal attribution*

The detection and characterisation of space threats do not primarily raise legal questions, but rather technical, operational and governance challenges involving the Union, its various specialised entities, and the Member States. These mechanisms are nonetheless essential to addressing one of the most complex legal issues in the context of space attacks, namely the attribution of responsibility.

Technical detection and characterisation of space attacks

One of the main technical challenges in the space domain is achieving near-real-time awareness of activities in orbit, which is the function of the Space Domain Awareness (SDA). It consists of detecting, identifying and characterising space objects of interest in near real time, understanding their behaviours, and linking this information to underlying doctrines

⁹⁹ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 7.

and associated space systems.¹⁰⁰ This situational picture is nourished by intelligence from Member States, with the EU cooperating closely with national space commands that provide regular updates on threats in orbit.¹⁰¹

The Union's SDA architecture rests on several complementary components that collectively support both operational protection and legal attribution. The EU SST Partnership provides collision and fragmentation detection based on Member States sensors,¹⁰² and, the SatCen delivers geospatial intelligence that supports attribution by detecting adversary activities and assessing damage to space and ground infrastructure. In parallel, the Single Intelligence Analysis Capacity (SIAC) produces classified analyses of the space threat landscape by synthesising Member States intelligence and open-source information, thereby contextualising detected activities within broader strategic assessments. At the same time, the Cybersecurity Service for the Union Institutions, Bodies, Offices and Agencies (CERT-EU) and national cyber authorities conduct forensic analysis of cyber-based threats targeting space systems and their ground segments.¹⁰³

To reinforce this ecosystem, the Union is developing the European Space Shield initiative. This project is intended to strengthen Member States' defence capabilities and enhance the resilience and protection of space assets and services in an increasingly hostile threat environment.¹⁰⁴ The overarching objective is to establish and safeguard a coherent European system of space capabilities serving defence purposes, building on both EU space systems and existing national capacities, and thereby providing a more robust basis for credible attribution and response.

¹⁰⁰ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 8.

¹⁰¹ KALLAS 2025.

¹⁰² Regulation (EU) 2021/696, Article 4.

¹⁰³ FIOTT 2022: 25.

¹⁰⁴ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2025b: 8.

Legal attribution of space attacks

Attribution is one of the central legal challenges raised by space attacks, since any meaningful response presupposes that the conduct can be linked to a responsible State or, at least, to identifiable non-State actors. The mechanisms for detecting and characterising space activities are therefore not merely operational tools, but indispensable preconditions for legally and politically credible attribution. The EUSSSD explicitly underlines that SDA is “key for attributing space threats in orbit and triggering a potential EU response” and calls on Member States that own and develop the relevant capabilities to provide SDA services to the Union to ensure its strategic autonomy in the space domain.¹⁰⁵

However, in practice, even robust SDA capabilities do not eliminate the inherent difficulties of attribution. It remains particularly challenging for non-kinetic operations where technical forensics are ambiguous, for in-orbit activities carried out by satellites with opaque ownership or control structures, and for dual-use behaviours that may mask hostile reconnaissance or weapons testing behind ostensibly civilian or commercial operations.¹⁰⁶ Indeed, the non-physical nature, cross-domain effects and anonymity that characterise cyber operations against space infrastructure further complicate the identification of perpetrators and the legal qualification of their acts under the existing international framework. These features hinder both the assessment of whether an operation reaches the threshold of use of force and the ability to attribute that operation to a State with the standard of proof required by the law on State responsibility.¹⁰⁷

In sum, resolving the most acute attribution difficulties will depend not only on the progressive clarification of applicable legal standards, but also, perhaps primarily, on strengthening the protection of space systems to reduce the scope for successful attacks in the first place, and on continuously

¹⁰⁵ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 8.

¹⁰⁶ CESARI et al. 2020.

¹⁰⁷ SU-JIANG 2025.

improving the technical mechanisms for detecting and characterising hostile activities in orbit.

Legal framework governing responses to space attacks

Once a space attack has been technically characterised and legally attributed, the question of how to respond becomes central. The notion of retaliation, understood here in a broad sense encompassing restrictive measures, diplomatic action and other non-forcible responses, remains relatively novel in the space context.¹⁰⁸ Depending on the gravity of the incident, the nature and extent of its effects, and the degree of political consensus, responses may be undertaken at the EU level or by Member States acting collectively.

Institutional EU response: Council Decision 2021/698

Mindful of the threats facing its critical space systems,¹⁰⁹ the Union has, through Council Decision (CFSP) 2021/698, established a framework that enables it not only to safeguard the continuity and integrity of its space infrastructure, but also to attribute and respond to threats that affect, or may affect, the security of the Union and its Member States.¹¹⁰

In the event of such a threat, the Decision provides that the Member States, the Commission, the European Union Agency for the Space Programme, or any security monitoring structure designated, are under an obligation to inform the HR/VP without delay of all relevant elements at their disposal.¹¹¹ The HR/VP, in turn, must immediately notify the Council of the threat and

¹⁰⁸ KALLAS 2025.

¹⁰⁹ Council Decision (CFSP) 2021/698 of 30 April 2021 on the security of systems and services deployed, operated and used under the Union Space Programme which may affect the security of the Union, and repealing Decision 2014/496/CFSP, OJ L 170/178, 12.5.2021, Recital 5.

¹¹⁰ Council Decision (CFSP) 2021/698, Article 1.

¹¹¹ Council Decision (CSFP) 2021/698, Article 2.

its potential implications for the security of the Union or of one or more Member States, accompanied by proposed instructions on the course of action to be taken. The Council, acting unanimously on a proposal from the HR/VP, then adopts the necessary instructions.¹¹² Where, however, the urgency of the situation does not allow for a prior Council decision, the HR/VP is authorised to adopt the provisional measures required, which the Council is subsequently called upon to confirm, amend or revoke as soon as circumstances permit.¹¹³

Although the Union asserts ownership over its space assets, the power to determine the substance of the response remains vested in the Council acting unanimously, with the HR/VP's autonomous role strictly circumscribed and confined to provisional action in situations of urgency. This unanimity requirement ensures that Member States retain decisive control: no response measure may proceed without the collective consent of Member States. Though structured by a Council Decision, the decision-making process remains fundamentally intergovernmental, with the HR/VP serving as coordinator of Member States will rather than as an independent institutional actor.

The EUSSSD clarifies that this mechanism is intended to serve as a dedicated “space toolbox”, complementary to the Union's cyber diplomacy and hybrid toolboxes.¹¹⁴ The range of responses contemplated includes, at the technical level, the activation of specific operational response modes embedded in the security design of space systems; at the diplomatic level, discussions, engagement in multilateral fora and public statements by the Union and the Member States aimed at preventing and responding to irresponsible behaviour in the space domain; and, at the economic level, the use of restrictive measures, including sanctions. The EU Military Staff is, furthermore, tasked with preparing any potential military contribution to the

¹¹² Council Decision (CSFP) 2021/698, Article 3.

¹¹³ Council Decision (CSFP) 2021/698, Article 4.

¹¹⁴ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 8–9.

Union's response in the space domain, thereby connecting this framework to the Union's broader security and defence posture.¹¹⁵

Notably, the EUSSSD explicitly envisages that Article 42(7) TEU on mutual defence could be invoked "should a space threat or incident amount to an armed attack on its territory".¹¹⁶ However, from a legal perspective, recourse to this Treaty provision in the context of space satellites is not as straightforward as it may appear. Careful analysis of this question is therefore required.

Collective Member States response: Article 42(7) TEU

Article 42(7) TEU provides that if a Member State is the victim of armed aggression on its territory, the other Member States shall have an obligation of aid and assistance by all the means at its disposal, in accordance with Article 51 of the Charter of the UN.¹¹⁷ The incorporation of this mutual defence commitment into EU primary law¹¹⁸ marked a significant step in the emergence of a European defence architecture, anchoring collective defence within the EU's own legal order rather than relying solely on NATO structures or bilateral arrangements.

It is now necessary to examine the impact of the distinctive characteristics of the space domain on the activation of this article and subsequently on the nature and implementation of the obligation of aid and assistance.

¹¹⁵ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 9.

¹¹⁶ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 9.

¹¹⁷ The Treaty on European Union, Article 42(7).

¹¹⁸ Introduced with the Lisbon Treaty and therefore terminating the Modified Brussels Treaty.

Challenges to activating Article 42(7) in the space domain

The legal threshold for triggering the Article is 1. an act of armed aggression 2. occurring on the territory of a Member State. However, in the event of an attack against a European satellite, satisfying these two criteria appears problematic. The potential activation of the mutual defence clause in response to such an attack faces two primary obstacles: the definition of what constitutes an ‘armed aggression’ within the space domain and the requirement of territoriality.

*The terminology of “armed aggression”
through the prism of space*

It is first necessary to examine the terminology the Union selected for its mutual defence clause. Unlike Article 5 of the North Atlantic Treaty or Article 51 of the UN Charter, which reference an “armed attack”,¹¹⁹ Article 42(7) TEU employs the term “armed aggression”.¹²⁰ The ICJ defines an armed attack as “the most grave forms of the use of force”,¹²¹ whereas the notion of aggression is understood to be “the most serious and dangerous form of the illegal use of force”.¹²² Even though Article 3 of the Definition of Aggression lists serious uses of force that often amount to an armed attack, the concepts are not interchangeable;¹²³ consequently, it is always necessary to analyse whether a particular act meets the gravity threshold of an armed attack.¹²⁴ The choice of the term ‘armed aggression’ therefore has the consequence of lowering the threshold for triggering the mutual defence clause.¹²⁵

¹¹⁹ The terminology diverges between the English and French versions.

¹²⁰ FAZIO 2025.

¹²¹ International Court of Justice, *Military and Paramilitary Activities in and against Nicaragua* (Nicaragua v. United States of America), 101.

¹²² UN Doc. A/Res/3314 (XXIX), Annex Definition of Aggression, Preamble, para. 5.

¹²³ UN Doc. A/Res/3314 (XXIX), Annex Definition of Aggression, Article 3.

¹²⁴ FAZIO 2024.

¹²⁵ BODDENS HOSANG – DUCHEINE 2023; CLAPP–VERHELST 2022; MARTIN 2024: 269–270.

This lower threshold raises the question of whether the clause could be triggered by a cyberattack that remains below the threshold of a conventional military attack but inflicts significant damage on an EU Member State.¹²⁶ This question is essential for our analysis: while one cannot exclude the possibility of a satellite collision or an anti-satellite (ASAT) strike, the primary risks threatening satellites remain cyberattacks, as demonstrated by the Russian attack on the ViaSat network.

In general, applying international law to cyberspace is complex. Although the UN General Assembly has recognised that international law is fully applicable to cyberspace, just as it is to traditional conflict areas on land, at sea and in the air, the international community continues to grapple with this issue.¹²⁷

The Union has not provided a concrete answer as to whether a cyberattack would entail the potential activation of the mutual defence clause.¹²⁸ However, it must be highlighted that it has already organised scenario-based exercises on the activation and implementation of the mutual assistance clause following large-scale cyberattacks.¹²⁹

Nevertheless, the interpretation governing the legal threshold for activating the article appears sufficiently expansive, when analysing the unique activation of the article by France in November 2015, following the terrorist attacks in Paris.¹³⁰ This precedent is particularly instructive, as the clause was activated in response to terrorism, despite the initial understanding that armed aggression must originate from an external State actor.¹³¹ This expansive interpretation of 'armed aggression' that emerged from that unique

¹²⁶ FAZIO 2025.

¹²⁷ UN Doc. A/Res/73/266: Advancing responsible state behaviour in cyberspace in the context of international security. The Tallinn Manual 2.0, widely regarded as authoritative in this field, establishes that a cyber operation resulting in serious injury or death or causing significant damage to or destruction of property would meet the threshold and effects of an actual armed attack.

¹²⁸ European Commission 2020.

¹²⁹ Council of the European Union 2022b.

¹³⁰ ANGHEL-CIRLIG 2016; MARTIN 2024.

¹³¹ Although France justified this by stating that the attacks had been planned in Syria. MARTIN 2024: 270–271.

activation to date suggests that a similarly expansive interpretation could equally apply in the present context of cyberattacks and space operations.

Therefore, it falls to the victim Member State to determine, in its sole discretion, whether that specific cyberattack constitutes an “armed aggression” within the meaning of Article 42(7) and thus warrants its invocation, and secondly, whether the aggression occurred on its territory, the second critical legal threshold for activation.

The territorial requirement challenged by space specificity

It is now necessary to examine the second legal threshold of Article 42(7) TEU: the requirement that the aggression must occur on the territory of a Member State. Regarding the space domain, this question arises on at least two levels: first, concerning an attack¹³² on the ground segment of a space system located on Member State territory; and second, regarding armed aggression against the space segment.

At first glance, the first scenario does not raise significant territoriality issues, as the ground segment is physically located within the territory of a Member State. By contrast, the second scenario is more complex. Since satellites operate in outer space, an international realm,¹³³ one might assume that armed aggression against them would not occur on the territory of a Member State. Thus, the conditions for activating the clause would not be met.

However, from a technical perspective, the ground segment cannot function without the satellite segment, and *vice versa*. Given this interdependence, it is difficult to envisage how an attack on one component would not affect the other. Consequently, it would be logical to argue that if the space segment were to suffer armed aggression, this could be interpreted as an attack on the space system as a whole, and, by extension, on the ground segment located on Member State territory.

¹³² The terms “(armed) aggression” and “attack” are used interchangeably herein for stylistic purposes to avoid repetition and should not be confused with the legal concept of “armed attack” under international law.

¹³³ FIOTT 2022: 26–27.

If this interpretation remains unconfirmed, an analysis of European legislation suggests that the Union has not adopted the logic of treating space systems as unified wholes. Indeed, the NIS2 Directive,¹³⁴ (which concerns the cybersecurity of sectors designated as highly critical, including the space sector) confines its *ratione materiae* scope to “ground-based infrastructure [...] that support[s] the provision of space-based services”,¹³⁵ thereby explicitly excluding the space segment of the system. This approach clearly establishes a distinction in status and applicable legal regime between the space and ground components of a space system. Even if this choice likely stems from pragmatic considerations regarding the implementation and verification of the Directive’s provisions, by analogy, one might be compelled to conclude that this distinction would also apply to the interpretation of Article 42(7). This would prevent armed aggression against satellites from being encompassed within the scenarios for activation, as they do not fulfil the article’s territoriality condition.

This challenge that the EU faces reflects a broader interpretive problem affecting collective defence frameworks. NATO faces a similar predicament under its mutual defence clause.¹³⁶ Article 6 of the North Atlantic Treaty defines ‘armed attack’ as occurring either on the territory of the parties [similar to Article 42(7)] or “on the forces, vessels, or aircraft of any of the Parties”.¹³⁷ It would thus appear that satellites do not fall within the direct scope of NATO’s mutual defence clause.¹³⁸ However, NATO leaders have recently agreed that “attacks to, from, or within space present a clear challenge to the security of the Alliance, the impact of which could threaten national and Euro-Atlantic prosperity, security and stability, and could be as harmful to modern societies as a conventional attack. Such attacks could lead to the

¹³⁴ Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (NIS 2 Directive), OJ L 333/80, 27.12.2022.

¹³⁵ Directive (EU) 2022/2555, Article 2 and Annex I.

¹³⁶ See the chapter authored by Endre Miszori in this book.

¹³⁷ North Atlantic Treaty, Article 6.

¹³⁸ North Atlantic Treaty, Article 5.

invocation of Article 5”.¹³⁹ This precedent demonstrates that where political will converges with strategic necessity, mutual defence clauses can evolve beyond their textual scope to encompass space-based threats.

Therefore, it seems that where political will exists, as has been the case with NATO, the interpretation of these provisions can evolve alongside technological and societal advancements. A similar development could occur with respect to the Union and Article 42(7). Whilst the EUSSSD stated that Member States can invoke the mutual assistance clause “should a space threat or incident amount to an armed attack on its territory”,¹⁴⁰ this formulation remains ambiguous regarding the territoriality of the incident: it could still refer exclusively to the ground segment rather than encompassing attacks on satellites in orbit.

In January 2025, the HR/VP affirmed that Member States may resort to Article 42(7) if “an attack in space or against space infrastructure” were to occur.¹⁴¹ The formulation ‘attack in space’ suggests an attack against the space segment of the system, thereby potentially extending the territorial threshold. Unlike NATO’s explicit political commitment, the Union’s stance remains comparatively ambiguous and less categorical, leaving open the question of whether the mutual defence clause can be invoked for armed aggression directed solely against satellites in orbit.

However, a more expansive interpretation could bring the legal conditions into line with the political ambition to apply Article 42(7) to a space attack, through what is known as an effects-based analysis.¹⁴² Initially developed in the context of cyberattacks, this approach focuses not on where an attack originates, but on its direct and significant consequences within Member State territory. An operation occurring outside physical territory can constitute armed aggression “on” that territory if it produces

¹³⁹ North Atlantic Treaty Organization 2021. A position confirmed by NATO’s updated policy on “Collective Defence and Article 5” on its website last updated in November 2025.

¹⁴⁰ European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 9. Confirmed by the Council Conclusions on the EUSSSD.

¹⁴¹ KALLAS 2025.

¹⁴² MARTIN 2024: 267–268.

direct material effects on critical infrastructure. This framework could be applied to space systems, as EU space infrastructure constitutes critical infrastructure of sovereignty:¹⁴³ attacks disabling these systems produce cascading consequences on terrestrial territory, affecting financial systems, power grids, transportation networks and emergency services.¹⁴⁴ The HR/VP's statement that "when we defend space, we are defending our economies [...] [t]he security of our satellites is the security of our societies"¹⁴⁵ captures this logic: space system security directly determines territorial security and functionality, thereby satisfying Article 42(7)'s territorial requirement through demonstrated effects rather than physical location. However, this effects-based doctrine carries a significant interpretive risk: the framework relies on causality chains that may be difficult to establish with legal certainty, distinguishing between a space attack producing direct armed aggression consequences versus collateral economic damage remains contested, potentially lowering the threshold for what constitutes actionable armed aggression under the mutual defence clause.

In sum, the territorial condition is undermined in the context of space-based aggression. Traditionally rooted in a physical and geographical conception of territory, this requirement struggles to apply to attacks on orbiting satellites. However, the Union's political will and broad legal interpretations, notably the effects-based approach, enable the legal thresholds to be met and Article 42(7) activation to be possible.

However, another critical question remains: Article 42(7) stipulates that the victim of armed aggression must be a Member State. Yet, since the Union is the owner of European satellites, if an attack were to occur against them, the victim would not be a Member State but the EU itself. An attack against a European system targeting its ground segment does not raise this question acutely, as that component is physically located on the territory of a Member State; thus, that State would have suffered aggression on its territory even though the assets concerned belong to the Union. The question becomes more delicate for satellites operating in

¹⁴³ Council of the European Union 2022b; DEEN et al. 2022: 16.

¹⁴⁴ FAZIO 2024: 10.

¹⁴⁵ KALLAS 2025.

outer space. In such circumstances, is a Member State the “victim”? If the Union is the victim of an attack against a European satellite, and since these services serve all Member States collectively, then all Member States are simultaneously victims. But who, then, must assist whom? It would appear that in such cases, all Member States would be required to assist the Union itself. This would require yet another expansive interpretation of Article 42(7), prompting questions about its actual relevance and coherence. Even as EU documents and political declarations persistently reference Article 42(7) as the response mechanism to space attacks,¹⁴⁶ the entirety of the legal thresholds associated with its activation appears undermined by spatial specificity, or at a minimum, by the specificity of attacks against EU-owned satellites. This illustrates that where political will exists, legal safeguards are interpreted and reconfigured to such an extent that one must question the very pertinence of such juridical barriers. This question hangs unresolved.

We must now turn to the duty of aid and assistance that flows from the activation of this article, to determine what substantive obligations actually weigh upon Member States once this clause is invoked.

Consequences of the space domain for aid and assistance obligations

Once activated, Article 42(7) creates a legally binding obligation on all Member States to assist the attacked State. However, the article prescribes neither a formal procedure for invoking it nor any requirements for the assistance provided thereafter. Understanding how this framework applies to space requires examining both its flexibility in practice and its articulation with complementary legal mechanisms.

¹⁴⁶ Council of the European Union 2022b; European Commission and High Representative of the Union for Foreign Affairs and Security Policy 2023: 9; KALLAS 2025.

Great flexibility in invocation and Member States response

When France invoked Article 42(7) following the 2015 terrorist attacks, it did so only by way of a political declaration, since neither detailed procedural requirements nor prior authorisation by an EU institution are required. Although the Council discussed the French invocation, it did not adopt a formal decision. Instead, it confirmed that the Member States unanimously considered that the support provided to France satisfied their legal duty of assistance, that no formal Council decision or Council Conclusions are needed for Article 42(7) to be triggered, and that the assistance takes the form of bilateral aid rather than a single unified EU operation.¹⁴⁷ This practice illustrates the mechanism's fundamentally intergovernmental nature and the continuing centrality of Member States sovereignty.

In contrast to the flexibility of invocation, the response obligation for other Member States is exceptionally demanding. Unlike NATO's Article 5, which assists "as it deems necessary", Article 42(7) imposes that Member States have "an obligation" to provide "all aid and assistance by all the means in their power". This formulation creates a legally more compelling duty than NATO's mutual defence clause, yet it does not specify how this obligation must be discharged, as it does not create an integrated command structure or an automatic military response. On the contrary, assistance can range from diplomatic support and technical or medical help to civilian or military aid. For the unique precedent, assistance took a bilateral form. France requested increased contributions to the international fight against terrorism, and each responding State independently determined the form of support to provide. Therefore, Article 42(7) creates a unique legal architecture: a firm obligation (more compelling than NATO) discharged through extraordinarily flexible mechanisms (no formal procedures, bilateral arrangements, case-by-case determination).

However, some Member States called for its "operationalisation", stating that "another lesson [they] collectively identified is the importance of European solidarity to act and react to crises. A key work, in that regard, will

¹⁴⁷ Council of the European Union 2015: 6–7.

be the operationalisation of the Article 42(7) TEU”.¹⁴⁸ The EU subsequently committed to test the framework through structured exercises. This signals institutional determination to transform Article 42(7) from a dormant Treaty provision to a practical response mechanism.

The great flexibility of both the invocation and response processes makes Article 42(7) surprisingly well-suited to space incidents. Once a Member State invoking the clause considers activation conditions met and other Member States do not contest this decision, a threshold exemplified by the French case, the article may be applied to satellite aggression. Other Member States may assist in multiple forms: military support, diplomatic backing, economic measures, or technical assistance. However, the main technical challenge remains: attribution. Determining the attack’s origin is necessary for a credible invocation and for tailoring aid appropriately. However, the absence of strict procedural requirements provides unexpected flexibility for the EU-owned satellite scenario. Since no formal procedure exists, the Union itself could invoke Article 42(7), or any Member State could do so on behalf of collective European interests. This flexibility circumvents the “victim question” that would otherwise paralyse response.

*Complementary mechanisms: Article 222
and coordination architecture*

Article 42(7) can be operated simultaneously with other assistance mechanisms, most notably Article 222 TFEU. It establishes a solidarity clause obliging the Union and Member States to act jointly if a Member State is the object of a terrorist attack or the victim of a natural or man-made disaster.¹⁴⁹ Unlike Article 42(7) TEU, Article 222 is institutionally elaborated through Council Decision 2014/415/EU,¹⁵⁰ which specifies activation procedures, institutional responsibilities, and coordination mechanisms amongst EU

¹⁴⁸ Ministers of Defence of France, Germany, Spain and Italy 2020.

¹⁴⁹ Treaty on the Functioning of the European Union, Article 222.

¹⁵⁰ Council Decision 2014/415/EU on the arrangements for the implementation by the Union of the solidarity clause, OJ L 192, 1.7.2014.

agencies and Member State authorities. This dual-mechanism approach reflects a strategic logic, while Article 42(7) addresses armed response and military dimensions, Article 222 mobilises civil protection and institutional crisis management.¹⁵¹ Both may apply simultaneously to complex space incidents.¹⁵² However, since Article 222 is not explicitly referenced in the EUSSSD, the present chapter will not develop its analysis.

As the solidarity clause's purpose is crisis management for terrorist attacks, natural disasters, or technological disasters within Union territory, its scope expressly encompasses terrorist attacks committed through cyber means or interference with critical infrastructure, which could include space systems. Therefore, Article 222 may be activated if a space-related incident constitutes either a terrorist attack employing or targeting space infrastructure, or a man-made disaster producing severe consequences affecting Member States' populations, critical infrastructure, or territorial integrity.

While Article 222 offers advantages over Article 42(7) as EU institutions coordinate response more directly and specialised technical capacities mobilise rapidly, it suffers a few limitations: no military response authority, potential reluctance to invoke solidarity, and the requirement under Decision 2014/415 that affected Member States demonstrate exhaustion of national capabilities before requesting EU assistance. For space incidents, Article 222's most significant utility lies in hybrid scenarios in which hostile actions trigger cascading civilian consequences requiring a coordinated EU-level response beyond the capacity of a single Member State.

In this regard, the EU has established the Space Threat Response Architecture (STRA), a framework coordinating political, diplomatic, technical, and intelligence responses to security incidents affecting EU space systems. To test and refine this coordination architecture in practice, the Union has conducted a series of Space Threat Response Architecture exercises (STRA-X).¹⁵³ These exercises engage Member States in scenario-based simulations of attacks targeting EU space assets, demonstrating institutional

¹⁵¹ FIOTT 2022: 26–27; DEEN et al. 2022: 10–11.

¹⁵² FIOTT 2021: 6.

¹⁵³ European External Action Service 2025b: 9–10.

commitment and operational readiness.¹⁵⁴ STRA-X-24 addressed both the technical and higher-level policy aspects of the detection, attribution and response to space threats. This discussion also touched upon the potential invocation of Article 42(7), recognising the persistent challenges around attribution and the legal threshold for activation.¹⁵⁵

It is hoped, and the ongoing exercises and workshops suggest, that the various legal difficulties concerning utilisation of Article 42(7) and its articulation with complementary mechanisms, such as Council Decision 2021/698 and Article 222 TFEU, will continue to be progressively addressed. Only through continued practical operationalisation can the Union develop the legal and institutional clarity necessary for credible collective space defence.

CONCLUSION

Regarding the use of European satellites as *tools* in armed conflict, it is essential to emphasise that the use of these space systems for security and defence purposes is already explicitly established and operationalised within the context of CSDP missions. However, the conditions that would permit the Union itself to become a party to an armed conflict are so restrictive that such a scenario is virtually impossible and would arguably conflict with principles of international public law. Nevertheless, given the Union's strategy of permitting Member States to utilise these satellites in armed conflict, it is reasonable to assume that the Union would do likewise should it find itself in such circumstances. In any event, EU-owned satellites can legally serve within the framework of armed conflict, with relatively limited implications for third-party actors. The use of European space infrastructure for defence purposes operates within established legal parameters and does not fundamentally alter the international law obligations of the Union or its Member States.

¹⁵⁴ For more information on the relevance of wargames for space see FRANCIS 2025.

¹⁵⁵ European External Action Service 2024.

Regarding the legal framework governing EU-owned satellites as potential *targets* in armed conflict, it must be read in light of the Union's growing awareness of the critical role these infrastructures play. The EU has begun implementing procedures to mitigate these risks as far as possible, alongside technical and governance arrangements for detection, characterisation and attribution, even though these processes are particularly complex in the space domain. In parallel, the Union has developed two main avenues for response and retaliation: one based on unanimously adopted Council decisions, and the other grounded in the mutual defence clause in Article 42(7) TEU, even though this analysis has highlighted the significant difficulties involved in activating that clause for a space attack, especially when it comes to meeting its legal conditions. In any event, it is natural to conclude that recognising the need to strengthen the security of space systems is essential, and that the ambition to increase the use of European satellites for security and defence purposes has become unavoidable in light of mounting geopolitical tensions.

Making EU satellite data available for security and defence and ensuring the protection of the underlying infrastructure, can no longer be seriously questioned. The task now is to align the relevant legal frameworks with these political ambitions, while remembering that the Union remains an international organisation without a general defence vocation; nevertheless, it can serve as a central framework for intergovernmental coordination among all its Member States.

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Quentin Guého

LEGAL STUDY OF THE STRATEGIC
NECESSITY OF DEVELOPING
SOVEREIGN TELECOMMUNICATION
SPACE-BASED CAPABILITIES

Why U.S. Data Law Tells Us to
Develop Our Own Satellites

INTRODUCTION

“It’s not good for Europe to be the permanent security vassal of the United States.” For the United States Vice President J. D. Vance, Europe is a vassal of the United States.¹ This is also the conclusion of the latest National Security Strategy of the United States of America, dated November 2025: “Enabling Europe to stand on its own feet and operate as a group of aligned sovereign nations, including by taking primary responsibility for its own defence, without being dominated by any adversarial power.”² Europe would therefore be lagging behind, unable to steer itself, and the United States would be the unexpected saviour of the Old Continent.³ The United States is indeed preeminent in many sectors, including the digital and space sectors. Europe – meaning this term in a broad sense, both the European Space Agency (ESA), the European Union (EU) and the states of the European continent (in the narrow sense, excluding Türkiye and Russia) – is struggling to compete. Without focusing on the veracity of such a statement,

¹ France 24 2025a.

² The White House 2025a: 27.

³ This other quote helps to understand the spirit of the document: “But this economic decline is eclipsed by the real and more stark prospect of civilizational erasure” (The White House 2025a: 25).

it must be recognised that in the satellite communications sector, the U.S. mega constellations – namely the two main constellations, Starlink from the company SpaceX and soon Amazon LEO – dominate the world market pending the arrival of Chinese constellations.

At first glance, there is nothing to worry about: not all countries are destined to send such infrastructures into space; Europe is therefore not necessarily threatened by such activities and can even benefit from them, with, for example, the launch of Amazon's future satellites with Ariane 6. At first glance, only because the data that passes through these satellites is not protected. In contrast, U.S. law is designed to prevent legal protection. In this demonstration, we will explain the legal architecture that allows U.S. authorities to access all this data and the vulnerabilities it poses for European countries and their populations. This demonstration can only be complete after an understanding of the place of data and of the U.S. in our contemporary world.

CONTEXT – DATA, SPACE AND EUROPE

To understand the issues surrounding space telecommunications capabilities, it is necessary to explain first why and how data is at the heart of our society. Only once this element is understood and explained will we be able to contextualise the space sector in this environment. Finally, it will be time to show the respective places of the United States and Europe in this world of data.

Digital data at the centre of the world

The term *data* is very broad and can be defined in several ways. We will retain a broad but numerical definition: data is information, such as an image, a message, a document, but also more subtle information, such as the time a user uses an application, or his or her personal information. Metadata, data that provides information about other data, is included in this definition. In

short, everything that is created and/or informed and/or communicated on/by an electronic device is digital data that interests us. Digital data is created by a variety of actors: the average person, through their use of the internet, emails and other applications, but also companies (quotes, invoices, orders, patents, etc.), governments and armies. It is also becoming essential to take into account data generated by artificial intelligence of all kinds.

The numbers are uncertain, but the volume of data created each year continues to increase. In 2025, it is estimated that just over 400 million terabytes (TB) of data will be created each day, which would amount to about 147 zettabytes (ZB) by 2025.⁴ For 2029 alone, this figure is expected to reach 527.5 zettabytes.⁵ Figures so large that it becomes difficult to realise what they represent.⁶ For example, if a film weighed 1 gigabyte (GB), 1 zettabyte would be equivalent to 1,000,000,000,000 films, or 1 trillion films, i.e. a thousand billion films. This impressive amount of data, created and transmitted around the world, has even given its name to the Zettabyte Era.⁷ It can be difficult to determine which country generates the most data, as it depends on the parameters chosen: the nationality of the person creating the data, the nationality of the company publishing the software used to create it, and the place of storage. An analysis method considers four criteria: volume, use, accessibility and complexity. Without going into details, the countries that lead in data creation are considered rich and highly developed, with the United States leading the way. France comes sixth.⁸ Other European countries are generally at the top of the ranking, with the United Kingdom in second place, Switzerland in fourth, Sweden in eighth, and Germany in thirteenth, ahead of Spain, Ireland, Italy and Portugal, which are ranked 14th to 17th, respectively. And, of course, China ranks third. Software based

⁴ DUARTE 2025.

⁵ TAYLOR 2025a.

⁶ Ionos 2021.

⁷ For further information see https://en.wikipedia.org/wiki/Zettabyte_Era.

⁸ Zoxx Smart 2020.

on artificial intelligence will further increase the volume of data created,⁹ a sector in which the United States excels, even dominates.¹⁰

Another way is to look at the global distribution of data centres: the United States comes first with more than 45% (5,381 data centres in March 2024), followed by Germany, the United Kingdom, China, Canada and France in sixth place.¹¹ However, this does not reveal the nationality of the data centre's owner, which may differ. It is therefore interesting to note that the companies with the most data centres in the world are mainly American: Amazon Web Services (AWS) in first place, followed by Microsoft Azure, Google Cloud and Meta¹² – four of the five GAFAMs.¹³

This data represents significant potential for exchanges around the world, including online. However, not all of the data stored necessarily passes through the internet: some is used as a backup or archive or is rarely consulted. It should also be added that some data is stored on so-called local networks, which are therefore not directly connected to the internet.¹⁴ According to the International Telecommunication Union (ITU), global traffic will reach about 9 zettabytes in 2025, a figure that continues to grow.¹⁵

This data can take various forms: a video accessible online, a message posted on a social network or sent *via* a connected application, or a document sent by email. Data, as such, does not necessarily have great value, except

⁹ FOLEY 2024.

¹⁰ KOETSIER 2025.

¹¹ LU 2025. The ranking is therefore slightly different from the previous one, but developed countries remain at the top, demonstrating the link between wealth, digital usage and control of infrastructure.

¹² JACKSON 2024.

¹³ It should be noted here that we are focusing on GAFAM, but U.S. companies are present everywhere, all the time, at all levels. The problem is therefore systemic and requires global awareness, not just digital awareness. We are thinking, for instance, of McKenzie Wark's work on the vectorialist class, which refers to economic agents who own and/or control the vectors through which information and emotions circulate between us in digital form. GUILLAUD 2025: 132–133.

¹⁴ It is estimated that half of the data is stored on servers that are not directly connected to the network, but it is obviously impossible to know. Edge Delta 2024.

¹⁵ ITU 2025.

for the creator and the recipient. In other cases, the data may have great intrinsic value, such as plans for a new technological innovation.

First of all, it should be noted that data can be produced by different categories of people: private individuals, companies, governments, institutions and armies. The importance of the data and its level of protection depend on the data itself: an individual's medical data is highly sensitive, as is the document describing a state's military strategy or the merger plan of two companies. The value of the data, therefore, depends greatly on the creator of the data and on the person who wants to use it: the personal messages of a private person may be of little importance to an army, but of great importance to a government or a company. Military strategic documents, on the other hand, are of no use to a private person, while a foreign government will know how to make good use of them. So, depending on where the data comes from, where it is going, and what it can be used for, the value of the data changes. Therefore, data accessibility is also a criterion to consider when evaluating its value.

Data, no matter what it is, is at the centre of our capitalist¹⁶ society,¹⁷ but data is never neutral, nor is the algorithm that processes it.¹⁸ For this demonstration, we will focus on two uses of data: commercial exploitation and a use that could be described as *regalian*, encompassing both governmental and military aspects. Regarding the commercial use of data, it is accepted that companies selling goods and services seek to maximise their profits *at all costs*. This requires a massive accumulation of data from private individuals – sometimes through problematic methods¹⁹ – to analyse the preferences and behaviours of the greatest number. This analysis then makes it possible, through many means such as advertising and marketing, to orient

¹⁶ The concept of “capitalism” is multifaceted. We will not enter into the debate, but will retain an element of the IMF's definition that we believe is sufficient for our demonstration: “The essential feature of capitalism is the motive to make a profit” (JAHAN – SABER MAHMUD s. a.).

¹⁷ SADOWSKI 2019.

¹⁸ GUILLAUD 2025: 28.

¹⁹ European Commission 2018: 67–87.

the consumption of the masses.²⁰ This is a surprising phenomenon at first glance, but it has been demonstrated: the behaviour of individuals can be largely influenced by companies.²¹ This accumulation of data, combined with in-depth analysis, also allows these companies to influence public policies through intensive lobbying.²² Through this lobbying, companies now have access to the highest levels of power to keep their interests at the top of the state's priorities.

Regarding the sovereign use of data, States have an obvious – but not necessarily legitimate – interest in accumulating the private data of their nationals (private or legal persons) or foreigners.²³ The state, and therefore the government, seeks to maintain its stability, civil peace and coherence, and thus its economic growth, a high employability rate, and a decent standard of living; in short, the prosperity of its inhabitants. The control and surveillance of the said inhabitants make it possible to achieve this goal in part. Data surveillance helps guard against both internal and external threats.²⁴ The government and its authorities, therefore, have every interest in accessing as much data as possible.²⁵ The best example remains the mass surveillance of civilian populations by the U.S. Government and some of its allies.²⁶ Furthermore, beyond the simple survival of the state, a government may seek to acquire more power. Armies, constantly preparing for the possibility of conflict, have just as much interest in accumulating this data and predicting future conflicts, as well as their form and nature.²⁷

These two examples of data use²⁸ serve as a basis for reflection to demonstrate the importance of maintaining a certain degree of sovereignty over our data.

²⁰ ZUBOFF 2019: 25–30.

²¹ ZUBOFF 2019: 271–314.

²² HATVP 2025; ZANDT 2022; THUY D. 2025; VOU 2020; SIERACZEK-LAPORTE 2025.

²³ TAMBOU – BARBOU DES PLACES 2020.

²⁴ SGDSN 2016; GARRIGOU 2025.

²⁵ SGDSN 2025.

²⁶ UNTERSINGER 2022.

²⁷ KOCH 2018; DROFF–MALIZARD 2024; HARDY 2021.

²⁸ Data can be used in many ways, and sometimes positively. For example, space data is also being used to combat climate change.

The space sector's place in this world of data

The vast amount of data generated and exchanged every day requires a dense, global infrastructure. As we have seen, online data is stored in data centres. Most – almost half – are in the United States, and the rest are spread around the world, mostly in Asia and Europe. Data centres are at the heart of this global network. These multiple cores are accessible anywhere in the world thanks to a network of cables and waves. The vast majority of countries worldwide are connected by submarine cables: more than 99% of data traffic passes through them.²⁹ Then the land cables take over. All these cables connect continents, countries, and data centres to enable data transfers. Today, the last few meters are often made by Wi-Fi or 5G, waves generated by antennas connected to the cable network.³⁰

The user – regardless of whether it is a private person, a company or a state – creates, consumes and transfers data, thanks to an electronic device – *hardware* – and one or more *software*. To access the network, the user needs a device (computer, smartphone) connected, either via cable (e.g. Ethernet) or wirelessly (e.g. 5G or Wi-Fi). These waves are emitted by devices (such as internet boxes or antennas) that are themselves connected to the local cable network, which is in turn connected to the global cable network. Service providers (e.g. Orange or Vodafone) act as intermediaries at the local level between data centres and users, *via* this network of cables and other ground infrastructure. Users consume data stored in data centres around the world and store their own data in those same centres. While users choose for themselves which services – and *software* – to use, and even which service provider to subscribe to, they generally do not decide exactly which data centre their data is stored in, or which submarine cable it travels through.

²⁹ GAUR 2026; International Telecommunication Union 2026.

³⁰ International Telecommunication Union 2025.

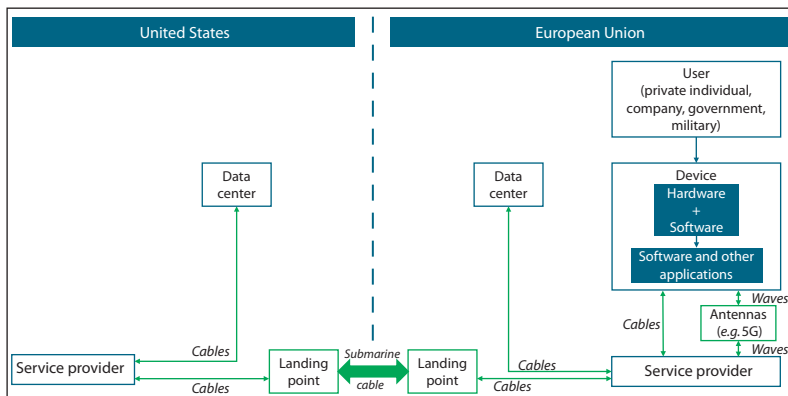


Figure 1. Network connecting a European user to data centres in Europe and the United States (excluding the space sector)

Source: Compiled by the author.

What is the place of space infrastructure in this network? Historically, satellites have been used to provide intercontinental television services (e.g. sports broadcasts or news channels).³¹ Private satellite communications were also possible, but rarer because they were very expensive.³² Of course, generously endowed armies had access to these technologies.³³ The New Space phenomenon has radically changed the space telecommunications sector: the falling cost of access to space and the miniaturisation of technologies have enabled the rise of low-Earth orbit mega constellations, allowing the provision of satellite telecommunications services to a wide range of consumers at a much more affordable cost:³⁴ in 1998, Iridium offered calls costing \$6 for 30 minutes from a \$3,000 phone, while Starlink offers

³¹ Cité de Télécoms s. a.; SAILLANT 1994.

³² CNES 2025a.

³³ LACOMIA 2025; GUILLOU 2013; PAOLINI 1987.

³⁴ CNES 2025b; RAINBOW 2024; FERNHOLZ 2024; CROSHIER 2022.

high-speed internet access for a subscription starting at €29 per month and an antenna costing a few hundred euros.³⁵ The Starlink constellation is the most emblematic and developed to date, but others exist or are in development, including OneWeb, Amazon Leo, and many Chinese projects.³⁶

These satellite networks can be inserted into the global network in different ways. In the first scenario, the satellites simply replace the submarine cable. The information passes from the data centre to the satellites via a ground station. It is then transmitted via another ground station to the user or another data centre *via* the existing network.

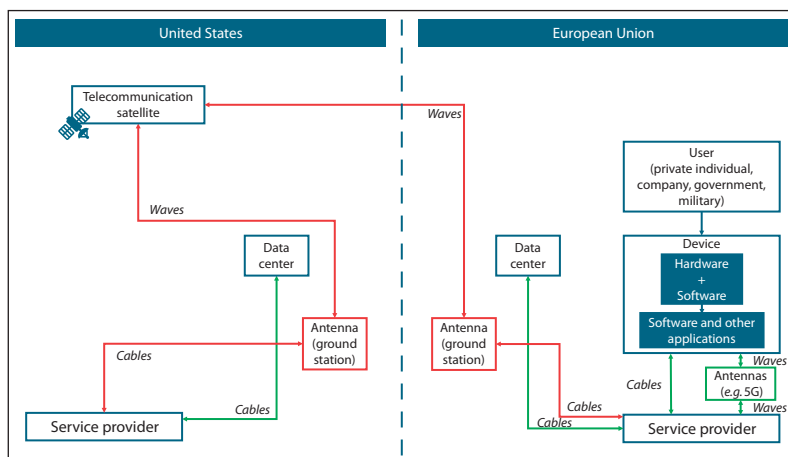


Figure 2. Satellite network connecting a European user to data centres in Europe and the United States via a ground station

Source: Compiled by the author.

³⁵ HEIJMANN 2022; Starlink s. a.

³⁶ McDOWELL 2026.

In a second scenario, the user has a private antenna that acts as an individual ground station. The satellite network acts directly as a network provider here. This integration is particularly indicated in rural areas not connected to the grid.

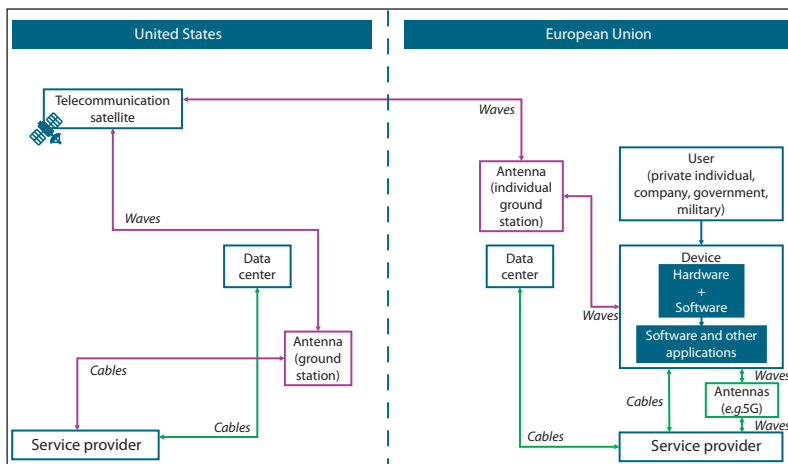


Figure 3. Satellite network connecting a European user to data centres in Europe and the United States via an individual ground station

Source: Compiled by the author.

The third scenario connects the satellite network directly to the user's device: this is the direct-to-device. There is no longer a need for antennas; the user is directly connected to the satellites. On the other hand, we typically find a ground station connected to the data centres and, more generally, to the network.

Satellite telecommunications are therefore part of a broader system of users, devices, data centres and submarine cables. The question of infrastructure control, therefore, arises.

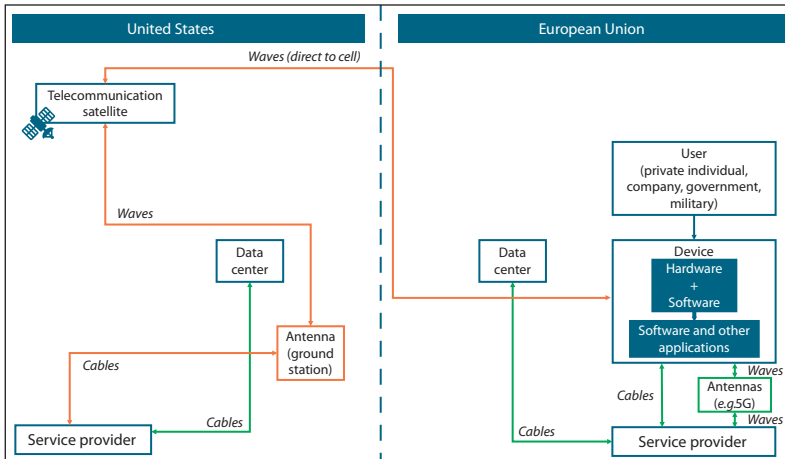


Figure 4. Satellite network connecting a European user to data centres in Europe and the United States via direct to cell

Source: Compiled by the author.

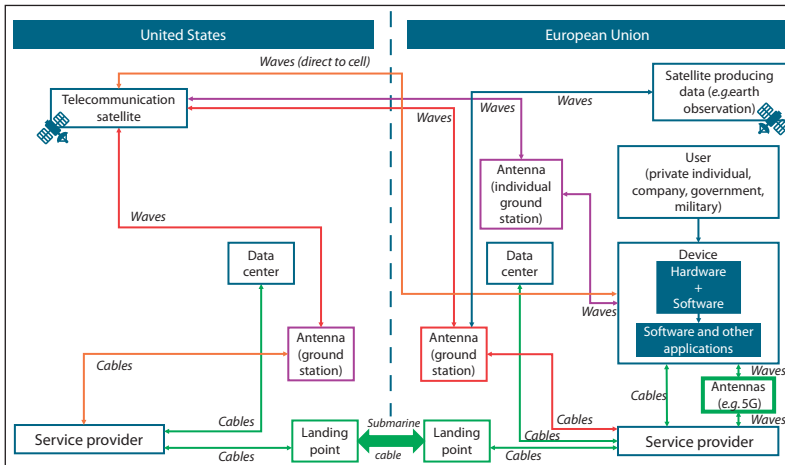


Figure 5. Network connecting a European user to data centres in Europe and the United States (including the space sector)

Source: Compiled by the author.

*The United States: An unmissable digital
space superpower for Europe*

The United States is at the centre of the global network. In particular, companies in the digital and space sectors are omnipresent. Social networks, submarine cables, mega constellations of telecommunications satellites, cloud: these private players are everywhere and are massively supported by the state. Before dwelling on U.S. regulations, it is first necessary to study the place of these U.S. private actors in our global network scheme.

Let us take the elements of our diagram one by one. First of all, as far as electronic devices – *hardware* – are concerned, while most of them are built in Asia,³⁷ the responsible companies are often American. With a few foreign exceptions – Samsung in South Korea,³⁸ Huawei in China³⁹ and, far behind, Nokia in Norway⁴⁰ – American companies have a good share of the market (Apple, Dell, Microsoft, Google, HP).⁴¹ Not to mention the software used on these devices: mainly Android (Google), Windows (Microsoft) and Apple systems.⁴² Users, both in the professional and personal spheres, therefore use American hardware and software solutions. These devices connect to antennas, which again mostly come from American companies, although Chinese (Huawei, ZTE) and European (Nokia, Ericsson) companies are also present.⁴³ In the cloud, U.S. companies are taking over the market, with Amazon having nearly one-third of the market share, with Microsoft, Google, and other U.S. and foreign companies competing for the remainder.⁴⁴ Submarine cables are largely financed and owned by U.S.

³⁷ LU 2023.

³⁸ Companies Marketcap 2026a.

³⁹ GOH-PAN 2025.

⁴⁰ Companies Marketcap 2026b.

⁴¹ ENCELOT 2024.

⁴² Global Stats 2026.

⁴³ Statista 2025; TAYLOR 2025b; TAYLOR 2025c.

⁴⁴ RICHTER 2025.

companies.⁴⁵ The same is true for mega constellations, a sector that is nevertheless undergoing a major transformation.⁴⁶

Some of these mega companies – the largest – are grouped under the acronym “GAFAM” for Google–Apple–Facebook–Amazon–Microsoft.⁴⁷ Each of these five companies focuses on the activities mentioned above, except for the mega constellations, which are then forced to form partnerships: Google Cloud hosts SpaceX’s Starlink ground stations,⁴⁸ and Microsoft Azure also works with SpaceX.⁴⁹

These giant companies are therefore concentrating their digital activities on applications and software that enable users to create data, as well as on data transfer and storage solutions. In short, they are present at each stage, often concurrently. It therefore becomes difficult not to use their services, voluntarily or involuntarily. The data, from its creation to its storage and transmission, is often controlled by a U.S. company, even when a European user is involved. In addition to the GAFAMs, the company SpaceX should now be added. Originally a simple launch company, the ecosystem that its boss, Elon Musk, is building is gradually getting closer to these digital giants: the Starlink mega constellation (equivalent to an underwater cable), the X social network, Tesla self-driving cars, the Grokipedia website, rumours about devices (phone,⁵⁰ robot⁵¹). Data control is at the heart of this empire.⁵² Should we now talk about the GAFAMS?⁵³

⁴⁵ The Economist 2017; MAULDIN 2024; QIU 2019; MCMAHON 2025.

⁴⁶ KNOTT et al. 2025; JULIENNE 2023.

⁴⁷ Géoconfluences 2025.

⁴⁸ Google Cloud Press Corner 2021.

⁴⁹ SOKOLOWSKY 2020.

⁵⁰ Tesla Pi Phone 2026.

⁵¹ Robot Tesla Optimus (https://fr.wikipedia.org/wiki/Tesla_Optimus).

⁵² IULIAN FLOREA 2025.

⁵³ It is possible to find a few blogs in this direction on the internet. Beyond the traditional GAFAMs, we often consider the “magnificent seven”, an expression that refers to the seven technology companies with exceptional performance: Nvidia, Meta (Facebook), Tesla, Amazon, Alphabet (Google), Microsoft, Apple. We notice the presence of Tesla, owned by Elon Musk. SpaceX is still unlisted on the stock exchange, but that could well change.

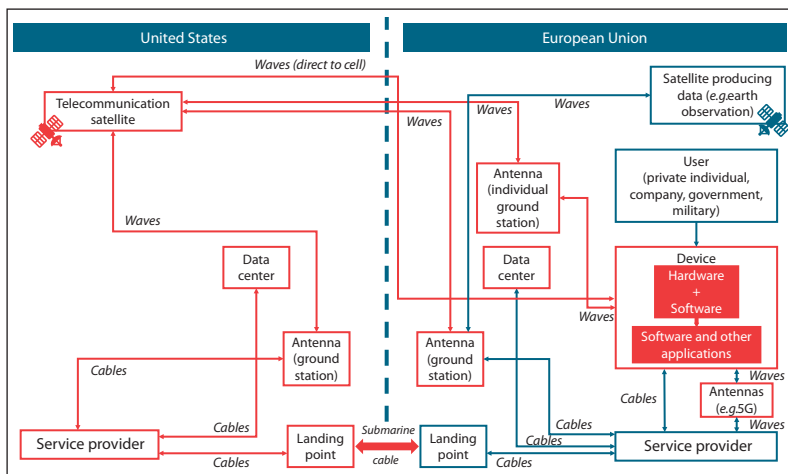


Figure 6. U.S. pre-eminence in telecommunications (in red)

Note: Other elements (in blue) may be non-European and non-U.S.

Source: Compiled by the author.

European users who want to use sovereign services, therefore, could feel trapped: they use American services, both personally and professionally, every day or almost every day. In itself, one could argue that it is not a serious issue. This could be true, at least if U.S. law were data protective. In fact, the legal framework governing GAFAMS is not data-protective.

LAWFARE: WHEN THE UNITED STATES USES ITS LAW AGAINST EUROPE

One of the foundations of international society is the possibility for each State to determine its own domestic law. Each state, including the United States, decides on the rules governing data, including its protection: how it is collected, who can access it, and under what conditions. Because the real challenge of data is its protection: the user wants to protect their privacy and prevent third parties from accessing it; these same third parties, public

authorities (States) and companies, want to have access to it to exploit it. The key is to find a happy medium between protecting users and economic and security interests (including national ones).

The European Union is a pioneer in the field, with its regulations protecting Europeans' personal data, even when collected by foreign companies: the famous GDPR (General Data Protection Regulation).⁵⁴ Other countries do not protect data as much: this is the case in the United States, as we will see in this section. A notion, therefore, appears in the background, that of lawfare, i.e. war by law. It is not a war as it is generally understood, with weapons and fighting, but rather a search for power through national regulations.⁵⁵ Some countries have integrated this tactic into their broader strategy, such as China.⁵⁶ In our case, U.S. regulations do not provide sufficient data protection, enabling both the U.S. Government and companies to gain relative power over European users. The data is therefore first collected, controlled, and transmitted in bulk by companies, including GAFAM and others, and then U.S. law allows U.S. authorities to consult this data.

*Stored data: The cloud, a giant reserve of data
legally accessible by U.S. authorities*

Several criteria must be taken into account: the nationality of the company storing the data; where the data is stored; the nationality and nature of the person storing the data (physical or legal, civil, military or governmental); what the U.S. authorities can do with the data; and finally, the reasons justifying such an action.

Starting with the Stored Communications Act (SCA),⁵⁷ which allows authorities to access data stored by American companies. The authorities can thus obtain a warrant to recover the content of the communications of interest:

⁵⁴ European Commission 2022.

⁵⁵ DEVEAUX-MONCEL 2025; FÉREY 2022.

⁵⁶ KOSUKE 2025.

⁵⁷ Legal Information Institute 2026b: 18 U.S. Code Chapter 121, § 2703.

A governmental entity may require the disclosure by a provider of electronic communication service of the contents of a wire or electronic communication, that is in electronic storage in an electronic communications system for one hundred and eighty days or less, only pursuant to a warrant issued [...] by a court of competent jurisdiction.⁵⁸

For requests concerning “the contents of a wire or electronic communication that has been in electronic storage in an electronic communications system for more than one hundred and eighty days”,⁵⁹ the authorities may obtain

[a] court order for disclosure [...] issued by any court that is a court of competent jurisdiction and shall issue only if the governmental entity offers specific and articulable facts showing that there are reasonable grounds to believe that the contents of a wire or electronic communication, or the records or other information sought, are relevant and material to an ongoing criminal investigation.⁶⁰

To obtain such legal authorisations from a judge, the authorities must generally justify probable cause.⁶¹

In addition to content, the authorities can demand “a record or other information about a subscriber to or customer of such service (not including the contents of communications)”⁶² thanks to a warrant⁶³ or thanks to the consent of the interested party.⁶⁴ Finally, the U.S. authorities can obtain data if they request it from service providers and the latter, “in good faith, believes that an emergency involving danger of death or serious physical

⁵⁸ Legal Information Institute 2026b: 18 U.S. Code Chapter 121, § 2703(a).

⁵⁹ Legal Information Institute 2026b: 18 U.S. Code Chapter 121, § 2703(a).

⁶⁰ Legal Information Institute 2026b: 18 U.S. Code Chapter 121, § 2703(d).

⁶¹ Congress 2022.

⁶² Legal Information Institute 2026b: 18 U.S. Code Chapter 121, § 2703(c)(1).

⁶³ Legal Information Institute 2026b: 18 U.S. Code Chapter 121, § 2703(c)(1)(A) and (B).

⁶⁴ Legal Information Institute 2026b: 18 U.S. Code Chapter 121, § 2703(c)(1)(C).

injury to any person requires disclosure without delay of communications relating to the emergency”.⁶⁵

The U.S. authorities can therefore access certain data if authorised by a judge. The judge is the guarantor of the protection of private data managed by American companies, by extension of the Fourth Amendment.⁶⁶ But when reading the SCA, the uncertainty surrounding the location of the data is noticeable: what if the American company stored the data of its foreign customers... abroad? It would then probably be impossible for the authorities to recover them without violating the sovereignty of this foreign state. The judges came to the same conclusion, pushed by the American company Microsoft, which refused to communicate data stored on an Irish server: “§2703 of the Stored Communications Act does not authorise courts to issue and enforce against U.S.-based service providers warrants for the seizure of customer e-mail content that is stored exclusively on foreign servers.”⁶⁷

The Clarifying Lawful Overseas Use of Data Act of 2018,⁶⁸ better known as the CLOUD Act, closes the gap by amending the SCA and requiring U.S. companies to communicate data stored abroad:

A provider of electronic communication service or remote computing service shall comply with the obligations of this chapter to preserve, backup, or disclose the contents of a wire or electronic communication and any record or other information pertaining to a customer or subscriber within such provider’s possession, custody, or control, regardless of whether such communication, record, or other information is located within or outside of the United States.⁶⁹

So if the service provider is subject to U.S. jurisdiction and the authorities have the legal authority to retrieve the data, the fact that the data is stored

⁶⁵ Legal Information Institute 2026b: 18 U.S. Code Chapter 121, § 2702(b)(8).

⁶⁶ Congress 2026: Constitution of the United States 1787, 4th Amendment.

⁶⁷ Justia U.S. Law 2016.

⁶⁸ Congress 2018.

⁶⁹ Legal Information Institute 2026b: 18 U.S. Code Chapter 121, § 2713.

abroad is no longer an obstacle. But the judge remains the custodian of this data, and the U.S. authorities must absolutely go through this step to access it.

However, a clarification:

A provider of electronic communication service to the public or remote computing service, that is being required to disclose pursuant to legal process issued under this section the contents of a wire or electronic communication of a subscriber or customer, may file a motion to modify or quash the legal process where the provider reasonably believes – (i) that the customer or subscriber is not a United States person and does not reside in the United States; and (ii) that the required disclosure would create a material risk that the provider would violate the laws of a qualifying foreign government.⁷⁰

A company that is asked to transmit data of a non-U.S. person who violates foreign law (e.g. European) may contest such a request by authorities.⁷¹ It is then up to the judge to decide whether or not the request is justified in the light of the “interests of justice”. A rather weak measure, therefore, which looks more like an attempt to reassure economic partners than a real protection of foreigners and their data stored abroad. It does not matter what the GDPR or any other European or domestic law says: U.S. law is superior and extra-territorial. Europeans must trust the American judge.

In parallel with these texts allowing *classic* surveillance in the context of legal cases, the U.S. authorities can demand data from foreign persons, stored abroad, as part of foreign intelligence. This is permitted by the Foreign Intelligence Surveillance Act (FISA),⁷² updated several times:

Notwithstanding any other law, the President, through the Attorney General, may authorize electronic surveillance without a court order under this

⁷⁰ Legal Information Institute 2026b: 18 U.S. Code Chapter 121, § 2703(h)(2)(A).

⁷¹ It should be remembered, on the subject of personal data, that the CNIL considers the United States to be a “country in partial compliance” with European regulations. Commission Nationale de l’Informatique et des Libertés 2025.

⁷² Legal Information Institute 2026d: 50 U.S. Code Chapter 36.

subchapter to acquire foreign intelligence information for periods of up to one year;⁷³

the Attorney General and the Director of National Intelligence may authorize jointly, for a period of up to 1 year from the effective date of the authorization, the targeting of persons reasonably believed to be located outside the United States to acquire foreign intelligence information.⁷⁴

The judge is completely bypassed here: nothing and no one protects the data and interests of Europeans anymore.

The surveillance of foreign persons using the services of American companies is therefore legally organised. It would then be strategic for these people not to use this type of service to protect the confidentiality of their data. But the SCA applies to any company under U.S. jurisdiction; as this term has not been defined by the texts concerned, it seems coherent to consider the classic rules of personal jurisdiction applicable in the United States, the minimum contact test: a foreign entity is subject to U.S. jurisdiction if the 'minimum contacts' with the U.S. threshold is met in such a way that exercising jurisdiction seems reasonable.⁷⁵ A European company with data centres in the United States could be concerned and subject to the SCA. In any case, the GAFAM(S) are fully concerned.

*Data transfer: The open door for U.S.
telecommunications services*

For the moment, we have studied the question of the U.S. authorities' capture of data stored on U.S. territory or abroad. Another key measure complements the United States' legal arsenal: the authorities can directly intercept communications during their transfer, without waiting for them to be stored. Starting with the Wire and Electronic Communications Interception and

⁷³ Legal Information Institute 2026d: 50 U.S. Code Chapter 36, §1802(a)(1).

⁷⁴ Legal Information Institute 2026d: 50 U.S. Code Chapter 36, §1881a(a).

⁷⁵ Justia U.S. Supreme Court 2012.

Interception of Oral Communications (Wiretap Act),⁷⁶ including section 2511,⁷⁷ which states that “providers of wire or electronic communication service”⁷⁸ can “intercept wire, oral, or electronic communications or to conduct electronic surveillance”⁷⁹ if the authorities provide a warrant⁸⁰ or a written attestation that a warrant or court order is not required.⁸¹ It should be noted that the definitions are very broad:⁸²

“electronic communications system” means any wire, radio, electromagnetic, photooptical or photoelectronic facilities for the transmission of wire or electronic communications, and any computer facilities or related electronic equipment for the electronic storage of such communications;⁸³

“electronic communication service” means any service which provides to users thereof the ability to send or receive wire or electronic communications;⁸⁴ – the important notion here is again jurisdiction.

The authorities can also set up a “pen register or trap and trace device”,⁸⁵ but only to obtain metadata, without the content of the telecommunications.⁸⁶ Finally, the FISA, of course, concerns both stored and transmitted data, once again without any particular control by the judge.⁸⁷ This analysis of U.S. law shows that U.S. authorities can access data transmitted and/or stored by U.S. companies, both inside and outside the United States, and potentially data stored by foreign companies on U.S. territory. These texts

⁷⁶ Legal Information Institute 2026a: 18 U.S. Code Chapter 119 Part I.

⁷⁷ Legal Information Institute 2026a: 18 U.S. Code Chapter 119 Part I, §2511.

⁷⁸ Legal Information Institute 2026a: 18 U.S. Code Chapter 119 Part I, §2511(2)(a)(ii).

⁷⁹ Legal Information Institute 2026a: 18 U.S. Code Chapter 119 Part I, §2511(2)(a)(ii).

⁸⁰ Legal Information Institute 2026a: 18 U.S. Code Chapter 119 Part I, §2511(2)(a)(ii)(A).

⁸¹ Legal Information Institute 2026a: 18 U.S. Code Chapter 119 Part I, §2511(2)(a)(ii)(B).

⁸² Legal Information Institute 2026a: 18 U.S. Code Chapter 119 Part I, §2510.

⁸³ Legal Information Institute 2026a: 18 U.S. Code Chapter 119 Part I, §2510(14).

⁸⁴ Legal Information Institute 2026a: 18 U.S. Code Chapter 119 Part I, §2510(15).

⁸⁵ Legal Information Institute 2026c: 18 U.S. Code Chapter 206 Part II.

⁸⁶ Legal Information Institute 2026c: 18 U.S. Code Chapter 206 Part II, §3121(c).

⁸⁷ It should be noted that the Verizon telephone information retrieved by the NSA and revealed by Edward Snowden was obtained through a court order obtained under FISA. GREENWALD 2013.

also concern data of space origin or transmitted by space: they are, therefore, necessary to consider them when consuming U.S. space services.

In summary, U.S. companies have positioned themselves in such a way that European users are instinctively drawn, if not forced, to use their services, both in their personal and professional lives. These same users, in order to use the global network, also unknowingly use U.S. services. These services are now complemented by satellite constellations. On the one hand, these U.S. companies can directly exploit the data provided by users. On the other hand, the U.S. authorities also have access to this data through the extraterritorial legal framework in place in the United States. Control infrastructures and services to control data and use it for various purposes. Faced with this, Europe must react.

European law: Protective, but insufficient?

The European Union is also responding through its legislation. Aware of the dominance of U.S. digital services, two key pieces of legislation have recently come into effect, establishing a framework for the provision of internet services within the European Union: the Digital Services Act (DSA) and the Digital Markets Act (DMA). These two pieces of legislation have different objectives, and we will not take the time to examine them in detail here, but it is still worth understanding the motivations behind them.

The DSA applies to all companies, but the most significant obligations primarily target the largest platforms identified by the European Commission. The DSA imposes transparency requirements on companies regarding the management of online content, algorithms and advertising; enhanced protection for minors; improved traceability of online sellers; and a design intended to exert less control over consumers.⁸⁸ It is difficult to assess the legislation's actual impact on the sector after only a few years of implementation, but it has enabled European authorities to launch investigations.⁸⁹ National courts can also apply the DSA: this was the case

⁸⁸ Vie Publique 2025a; European Commission s. a.a; European Commission 2026a.

⁸⁹ Directorate-General for Communication of the European Commission 2026.

with a Dutch court, which ruled that Meta did not comply with the rules regarding users' choice to use Facebook and Instagram in chronological order rather than via the algorithm.⁹⁰ As for the DMA, it aims to combat anti-competitive practices by internet giants and address the imbalances in their dominance of the European digital market. This legislation targets so-called "systemic" services. It should allow European users to benefit from a wider choice of digital services by stimulating competition – thanks, among other things, to service interoperability – and, at the same time, reduce the power held by large companies such as GAFAM.⁹¹ Its success has yet to be proven, and difficulties appear to have already been identified.⁹²

Thus, European consumers could be better protected thanks to these regulations. However, their data remains at the mercy of U.S. authorities, regardless of where it is stored, if a U.S. company gains access to it. EU Member States are now exploring "sovereign cloud" solutions, which offer specific safeguards for governments and their agencies. One player in this market is Amazon Web Services. While promising security measures that offer complete data security,⁹³ one cannot help but question the effectiveness of such a solution, given the extraterritorial reach of U.S. law, a concern also raised by the French Parliament.⁹⁴ Other players, this time European ones such as OVHCloud, offer sovereign solutions.⁹⁵ Governments must choose the best solution for themselves and the EU, without compromising on data security and, ultimately, their independence.

In addition to this structural weakness of European law compared to U.S. law, U.S. companies and authorities are working to undermine the legal framework established at the EU level.⁹⁶ Through aggressive lobbying, they might well succeed.⁹⁷ If the European Union wants to protect its

⁹⁰ MEIJER 2025; STERLING 2026.

⁹¹ Vie Publique 2024; European Commission s. a.b; European Commission s. a.c.

⁹² EDRI 2025.

⁹³ TERWELLEN 2025.

⁹⁴ LOPEZ-LIGUORI 2025.

⁹⁵ OVHCloud s. a.

⁹⁶ PAMUK 2025.

⁹⁷ SOARES 2026.

data and strategic independence from the United States, it must develop its own infrastructure.

VULNERABLE EUROPE: THE DEVELOPMENT
OF SOVEREIGN EUROPEAN SPACE
INFRASTRUCTURES AS A SOLUTION

American companies are therefore at the heart of the data sector, and particularly in space telecommunications. However, U.S. law is structured so that U.S. authorities can access the data of these companies, even if the owner (private or state person, including armies) is European. This poses two main risks: the first concerns our sovereignty and thus security, the second concerns our economy.

*A loss of sovereignty and therefore of
independence: A risk for our security*

European countries, including France, are very fond of the notion of sovereignty, and their inhabitants are very attached to it. A central and sacred notion in international law, enshrined in particular by the Charter of the United Nations, it is, according to Jean Bodin, a famous French thinker of the sixteenth century, defined as “absolute and perpetual power”.⁹⁸ More prosaically, sovereignty is the power of the state (an abstract figure, a legal fiction represented by its government or head of state) to do what it wants on its territory – in other words, internal sovereignty. This also translates into independence from other states – this is external sovereignty. Each State decides on its own laws, and, more generally, on its internal behaviour and responses to the international community, in compliance with international law.

⁹⁸ BODIN 1576.

Above all other criteria, independence is military – meaning that military capabilities enable independence, and therefore these capabilities must not depend on another state, because despite the prohibition of the use of force,⁹⁹ some states still use their armies not exclusively to maintain their integrity, but also to conquer new territories. The Russian invasion of Ukraine in 2022 is an example,¹⁰⁰ as is Israel's colonisation policy,¹⁰¹ as well as U.S. threats to Greenland¹⁰² or Panamá.¹⁰³ A state must preserve its military capacity to act and defend itself, which translates into the total independence of its army. Telecommunications are at the heart of any armed conflict. Plans, strategies, objectives, operational organisation, troop strength, arms control and drones; the transmission and storage of this data are sensitive operations that must be protected to ensure military independence. This U.S. control of data could eventually prevent European armies from being independent. Data control is also inseparable from infrastructure control; a rumour has it that Elon Musk, founder of SpaceX, has cut off connectivity to the Starlink mega constellation to prevent Ukraine from attacking Russia.¹⁰⁴ Italy, before backtracking due to concerns about national security, announced it wanted to use Starlink for its armed forces.¹⁰⁵ The risk here is twofold: the deletion of the service as such, as well as the risk of spying on all data that passes through American services. While the United States has historically been our ally, espionage was not a problem back then. Still, the situation has changed, and the protection of European sovereignty cannot rest on a *status quo* that is all the more fragile today.

The hesitation regarding military aid to Ukraine¹⁰⁶ or the U.S. administration's criticism of European policies regarding the conflict in Iran¹⁰⁷

⁹⁹ Charter of the United Nations 1945: 2.4.

¹⁰⁰ CLARKE 2025.

¹⁰¹ UN News 2025.

¹⁰² BRYANT 2026.

¹⁰³ Franceinfo 2024.

¹⁰⁴ CREAMER 2023.

¹⁰⁵ AMANTE 2025.

¹⁰⁶ GREEN et al. 2025.

¹⁰⁷ WÄLDE 2026.

points to a growing danger for European countries of a shift in international relations. Let us also recall the conclusions of the Draghi Report:

European collaborative procurement accounted for less than a fifth of spending on defence equipment procurement in 2022. Member States also do not favour competitive European defence companies. Between mid-2022 and mid-2023, 78% of total procurement spending went to non-EU suppliers, out of which 63% went to the US.¹⁰⁸

The EU is militarily dependent on the United States even as it can no longer rely on this ally. Yet, in the event of a conflict with the United States, the consequences are threefold: our data will be siphoned off by the U.S.; U.S. services will cease to function; and the armed forces of EU Member States will no longer receive U.S. weapons, ammunition, or military technology. The consensus is nearly unanimous:¹⁰⁹ the EU must regain its full independence from the U.S.¹¹⁰ NATO currently provides a significant portion of Europe's military deterrence; yet "alliances are no longer secure",¹¹¹ and at least a portion of European public opinion would like to see the EU play a greater role in this common defence.¹¹² The European Commission's 2026 Work Program embodies this commitment: "To be able to take care of its own defence and security";¹¹³ as does the Strategic Agenda 2024–2029: "We will invest substantially more and better together, reduce our strategic dependencies, scale up our capacities and strengthen the European defence technological and industrial base accordingly."¹¹⁴

¹⁰⁸ European Union 2025a: 8.

¹⁰⁹ It should be noted that while the EU appears unanimous in its strategies regarding its desire for independence from the United States, the perception of these issues in Eastern Europe is different, partly due to the region's proximity to Russia, but also because of its internal political landscape. DELL'ANNA–YILMAZ 2025; KRASTEV–LEONARD 2025.

¹¹⁰ HUTAGALUNG 2025.

¹¹¹ Vie Publique 2025b.

¹¹² KUBILIUS 2026.

¹¹³ European Commission 2025a.

¹¹⁴ European Council 2024: 4.

Beyond this necessary military independence, which cannot be subject to any exceptions, European states must also maintain their infrastructural independence. Because the use of foreign constellations, cables and equipment represents an intrinsic risk: the cessation or limitation of the services provided, the software made available, the hardware, the spare parts, up to the extraction, refining and, more generally, the availability of resources and raw materials. If it is impossible to produce all this infrastructure nationally and provide all these services, then a state concentrating its infrastructure to such a large extent poses a disproportionate risk. It is now tempting to take this risk, because it often amounts to savings at least in the short term,¹¹⁵ but it is a guaranteed loss of sovereignty in the long term. The Draghi Report urges European policymakers to break free from external industrial dependencies,¹¹⁶ a call that is beginning to bear fruit through several funding programs.¹¹⁷ Defence budgets across the EU have risen significantly between 2021 and 2024 and continue to rise.¹¹⁸

Let us look at two examples to illustrate this point. First, China dominates the production, refining and exportation of rare earth elements, which are essential for new technologies.¹¹⁹ However, the country is increasingly taking steps to limit these exports, putting pressure on global supply chains.¹²⁰ The second example concerns the U.S. practice of imposing an embargo not on a country but on an individual. For if an individual anywhere in the world behaves in a way that displeases the U.S. Government, the U.S. Government can prevent them from using any services provided by U.S. companies. Windows, Outlook, Visa, Mastercard, Google: the targeted individual finds themselves unable to use services they previously used frequently. This was the case for several judges and prosecutors at the International Criminal Court (ICC), who were targeted for their involvement in proceedings

¹¹⁵ CASANOVA TORMO 2025.

¹¹⁶ European Union 2025b: 159–171.

¹¹⁷ European Commission 2024.

¹¹⁸ Council of the European Union 2026.

¹¹⁹ PITRON 2023: 187–210, 323; FENG 2025.

¹²⁰ SZCZEPAŃSKI 2025; France 24 2025b.

concerning U.S. and Israeli nationals.¹²¹ Thierry Breton, a former European Commissioner and a leading figure in the fight against the unchecked power of GAFAM and efforts to regulate them, along with other high-ranking European officials, are also being targeted by sanctions.¹²² Some leaders of Member States are protesting, calling this an unacceptable interference in the EU's internal affairs;¹²³ Emmanuel Macron has contacted Donald Trump to request that the sanctions be lifted.¹²⁴ No one is safe, then; a French judge reportedly received a visit from U.S. diplomats regarding a case involving Marine Le Pen, leader of the far-right political party Rassemblement National.¹²⁵ The White House is said to have considered sanctions against the judges handling this case.¹²⁶ The solution, therefore, lies partly in sovereign infrastructure and partly in the diversity of foreign services, so as not to depend on a single third country.

The independence to be protected is also political in the broad sense: the protection of our democracies, but also of our societies as such, our values, our fundamental rights, our social protection and the functioning of our societies. Controlling data, especially access to it, means knowing exactly what the masses of individuals in a society think. It is therefore necessary to understand how this society works, to know how to influence it, and to disrupt and *ultimately* control it.¹²⁷ U.S. lobbying efforts aimed at dismantling the European Union – particularly its digital regulations – are significant in terms of the resources they deploy.¹²⁸ This *ideological war*¹²⁹ in which the United States is attempting to circumvent European regulations is perfectly illustrated by a U.S. website project: *freedom.gov*, where it is alleged that Europeans could access banned – illegal – content on the

¹²¹ The White House 2025b; International Criminal Court 2025a; International Criminal Court 2025b.

¹²² France 24 2025c.

¹²³ CLAVIER 2025.

¹²⁴ Le Monde 2026.

¹²⁵ Franceinfo 2026.

¹²⁶ MAZUIR 2026.

¹²⁷ ZUBOFF 2019: 657–695.

¹²⁸ POLLET 2025.

¹²⁹ VAN MIDDELAAR 2026.

European internet.¹³⁰ The principled fight that European countries should have waged decades ago is now a matter of civilisational survival.¹³¹ The European Union is aware of this,¹³² and the 2019–2024 agenda reflects it: “The EU needs to pursue a strategic course of action and increase its capacity to act autonomously to safeguard its interests, uphold its values and way of life, and help shape the global future.”¹³³

Finally, our independence must be economic, because the main challenge for digital companies is to monetise this data. But the monetisation of data is not the only issue: the economic threat manifests at different levels. First of all, it is a threat to European companies, which cannot develop in the digital sector because of this almost impossible-to-beat competition. As for the U.S. mega constellations, their use by European users prevents both ground operators (using cables and antennas) from maintaining themselves and investing, but also European constellations from developing. Secondly, American companies offering services through applications and other software exert significant influence on users (including Europeans) through algorithms.¹³⁴

*Developing Europe's own satellites and
other sovereign infrastructures*

SpaceX's Starlink constellation now represents more than half of the satellites in orbit.¹³⁵ According to its availability map, the company provides telecommunications on all five continents. It is therefore interesting to take the service provider as an example to illustrate this need to develop our own infrastructure.

¹³⁰ DOWN 2026. The concept of freedom of expression in the United States and Europe is radically different, and that's okay: sovereignty allows each country to develop its own values, laws and systems. The fact that a country seeks to circumvent this is simply interference.

¹³¹ SUTHERLAND 2026.

¹³² BARIGAZZI 2019.

¹³³ European Council 2019: 6.

¹³⁴ PICCARDI 2025; SÉE 2019; BERTAIL et al. 2019; GIRARDOT 2017.

¹³⁵ Orbital Radar 2026; ROBINSON-SMITH 2026.

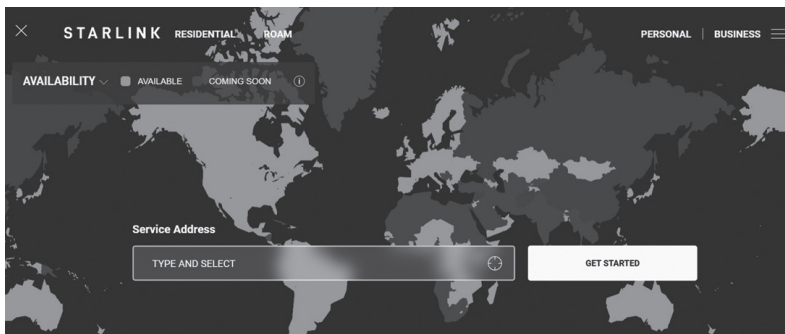


Figure 7. Accessibility map of Starlink services around the world as of the 26th of March 2026

Source: <https://starlink.com/map>

If SpaceX registers its satellites abroad,¹³⁶ the company, under its real name, Space Exploration Technologies Corp., is legally American. Initially incorporated in Delaware,¹³⁷ a U.S. state, the company has recently moved to Texas,¹³⁸ another U.S. state; the jurisdictional link is obvious. Starlink is a constellation of telecommunications satellites, and as such, SpaceX is a telecommunications service provider. Regarding data storage, SpaceX's Starlink does not normally store data: it is not a cloud or online storage, but a way to connect users to the internet. Starlink *gateways*, which connect the satellite network to the internet,¹³⁹ do not store data. On the other hand, SpaceX does transmit data, which is therefore vulnerable to the indiscretions of the American authorities. It should also be remembered, as we have seen, that SpaceX works hand in hand with American cloud providers, thereby increasing the risks. The Starlink telecommunications network is therefore particularly vulnerable to the U.S. legal spider's web, which should encourage European states not to use this service to protect their data. However, not every country receiving the Starlink signal today has made this choice.

¹³⁶ DE SELDING 2023.

¹³⁷ United States Securities and Exchange Commission 2017.

¹³⁸ SHETTI-KHUSHI 2024.

¹³⁹ Starlink Insider 2025; LINKSON 2025.

One could argue that this legal espionage – which is therefore not really espionage, since it is allowed and regulated by law – is not a big deal, especially in Europe. After all, the United States and European countries are allies. However, all the arguments push Europe against using Starlink.

First of all, a government must not use a foreign system to communicate sensitive data *internally*, i.e. to other entities in the same state. To communicate both governmental and military data between national entities, the system should be entirely sovereign; state- or EU-owned. Using a U.S. system means exposing oneself to obvious, announced espionage – written into U.S. law – by U.S. authorities. This strategy must concern not only American companies but also all suppliers of goods and services outside Europe.¹⁴⁰ Regarding external communications, the state should also use sovereign infrastructure, at the risk of sensitive government or military data being spied on by third parties. This is why it is essential that European states develop their own space capabilities.

It is also important to consider the change in the position of the U.S. administration towards Europe and the world to encourage our European leaders to emancipate themselves from services across the Atlantic. The United States has always oscillated between isolationism and interventionism. Still, Donald Trump's second term in office is a real turning point in the United States' relationship with Europe:¹⁴¹ economic pressure on taxes,¹⁴² military pressure on Greenland, NATO,¹⁴³ Ukraine and Iran. European states must interpret the signals as they are – Venezuela as sufficient proof – and seek to emancipate themselves.

This step is precisely to produce, on a European or national scale, the missing systems and operate them at the national or regional level. Of course, developing a mega constellation is not within the reach of all states. Still, Member States are fortunate within the European Union to be a collective of states with the capacity to trust one another enough to develop common sovereign infrastructures: this is the promise of the Iris²

¹⁴⁰ In this respect, we recall the scandal of Chinese 5G antennas. SCHMIDT 2024.

¹⁴¹ GATINOIS-RICARD 2025.

¹⁴² CLARKE 2026.

¹⁴³ COOK 2025.

constellation. Galileo¹⁴⁴ is a success story – the world’s most widely used and most accurate geolocation system¹⁴⁵ – as is Copernicus,¹⁴⁶ whose data is massively used by researchers around the world.¹⁴⁷ Europe, through its European Space Agency and its joint projects, has succeeded in conceiving, developing, building and operating a sovereign launcher, Ariane.¹⁴⁸ The benefits for the European Union and its members are enormous: total control over infrastructure and its operations, a controlled production chain, data protection, job creation, economic stimulation through the consumption of European services, and strengthening of government and military capacities. On a larger scale, the European Union has launched the Global Gateway program, which aims to make massive investments across various sectors worldwide,¹⁴⁹ including the digital sector¹⁵⁰ and undersea cables.¹⁵¹ The stated goal is to strengthen ties between the EU and third countries and to enhance the resilience of intra-EU systems. This is a response to China’s Belt and Road Initiative,¹⁵² but could also be a way for the EU to reduce its dependence on its American ally. The development of sovereign systems will also enable the EU to set its own technological and strategic agenda, based on its own priorities rather than those of other countries.¹⁵³

¹⁴⁴ European Union Agency for the Space Program 2025.

¹⁴⁵ European Space Agency 2024.

¹⁴⁶ Climate Data Store 2026.

¹⁴⁷ European Union 2022.

¹⁴⁸ ESA and its Member States have abolished the rule of the single regional launcher: from now on, countries develop private launchers at the national level. Is this the right method to counter U.S. space hegemony?

¹⁴⁹ European Commission 2026b.

¹⁵⁰ European Commission s. a.d.

¹⁵¹ European Commission 2025b; European Commission s. a.e.

¹⁵² Belt and Road Portal s. a.; BILAL et al. 2026.

¹⁵³ As this article is being finalised, the space sector is being shaken by two announcements from NASA: the Artemis program has been completely overhauled, replacing the lunar orbital station with a lunar surface station; and the ISS will not be replaced by fully independent commercial Earth-orbiting stations. The ESA Member States and the EU, key partners of the U.S., are affected by these changes. LOW 2026.

CONCLUSION

The current digital, space and data situation in the European Union is not particularly enviable. Its population massively uses U.S. services, and much of the world's digital architecture is directly owned by U.S. companies. Europe is vulnerable, politically, structurally and economically. Our military independence is, for the moment, generally maintained, but promises of short-term investment savings could well change the situation. This structural dependence is aggravated by U.S. law, which legally allows U.S. authorities to access all data collected, processed, stored and transmitted by U.S. companies. Unequal lawfare, because the American objectives are not the protection of the fundamental rights of the people, but the power of the state. A legal war already lost.

This observation is well known. This article has no merit beyond applying what is already known in digital law to the space sector, and it provides no interlocking vision of the issue. The space solution to this problem is simple: EU Member States need to develop sovereign, national and/or European infrastructures. The Member States are capable of doing so; they have already done so with Galileo and Copernicus. They *might*¹⁵⁴ be on their way to success again with Iris². There is therefore no shortage of skills, nor even political will or cooperation. Funding these projects can be an obstacle, but sovereignty comes at a price. The massive funding of European armies¹⁵⁵ shows that decision-makers are beginning to recognise this, even if it is far from being solved.¹⁵⁶ By the way, the European Commission's work program for 2026 is entitled "Europe's Independence Moment".¹⁵⁷ A message full of hope for the future.¹⁵⁸

¹⁵⁴ RUGAMER – LO NOSTRO 2026.

¹⁵⁵ CLAPP 2025; Le Monde 2025.

¹⁵⁶ The Economist 2025.

¹⁵⁷ European Commission 2025.

¹⁵⁸ To some European leaders, Donald Trump appears to be a threat. But he can also be seen as a way to recognise the EU's actual dependence on the United States and to act accordingly. For the EU, the second term of Donald Trump could be an opportunity. COUSTILLIERE 2025; KRASDEV–LEONARD 2025.

However, two things must be clarified. First of all, it must be made clear here that the solution does not lie in cutting all ties with the United States or its companies. The European Union must rethink its relations with the United States, interact differently and deny them the central place that the world has allowed them to take. This primarily involves diversifying the services and hardware on which the EU depends, including developing certain sovereign space and digital capabilities, developed and operated by the European Union and/or its Member States. At the same time, it is necessary not to rely on foreign infrastructure to maintain a sufficient market for this new infrastructure. The reasoning applies to the United States but also to any other foreign power. To take just one example, China is currently developing many mega constellations: the stakes are identical, as is the solution. Some space activities can be shared with the United States, such as large-scale international projects like the James Webb telescope or Earth observation constellations for scientific purposes.

This solution, therefore, seems simple. But is it even possible to refuse the use of foreign services on European soil? This is the advantage of sovereignty: each state has the power to prohibit the reception of a service on its territory or the sale of a product. For example, Starlink is only received in Europe because the Member States have individually agreed to receive the signal. States generally have to comply with their domestic competition laws, but protectionism is legally justifiable. It is time for EU Member States to understand the potential of lawfare and to develop their legal framework in this regard.¹⁵⁹

The second clarification concerns the need to develop such services; we live in a finite world with finite resources. EU must therefore not seek to develop goods and services *only* to have sovereigns, but because there is a demand, a need, on the part of the Member States and/or the European

¹⁵⁹ Member States, within the framework of their national sovereignty, must also take into account the European Union's internal market. If they can coordinate their efforts, this market – the largest in the world – can serve as a lever to compel third countries to comply with European law. The EU Space Act, currently under discussion, holds real potential – though it has yet to be fully realised – with regard to foreign operators such as SpaceX that provide services in Europe. European Space Policy Institute 2025.

Union. This article, therefore, does not argue for the mandatory development of European infrastructures per se. Still, if Member States decide to use them instead of terrestrial infrastructure, they must develop sovereign, sustainable infrastructure. When it comes to digital technology, our societies have already chosen to use these services on a massive scale, so it is high time to become independent. It is not necessary to *develop for the sake of* developing, but to develop well to serve a precise and socially useful objective. At the same time, this should apply to all foreign commercial activities, goods and services. It is also in the field of *soft power* that Europe must present itself and occupy space in its own way, preserving it for future generations, without necessarily following the American model of development. In the meantime, submitting to U.S. extraterritorial law does not seem to be an attractive or desirable solution. Let us build capacity; together, Europeans have the skills and the means to do it. It is at this price that European sovereignty, as well as the future of Earth and space activities, will be preserved.

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Recent conflicts, including the war between Russia and Ukraine and the conflict in the Middle East, have demonstrated that space-based capabilities can play a decisive role in contemporary warfare. Satellites can be used for communication, intelligence gathering, surveillance, navigation and targeting, but they can also become targets in hostilities. These developments raise complex legal and policy questions concerning the applicability and interpretation of international space law and international humanitarian law, state responsibility, neutrality, collective security, and the involvement of private actors in military activities. This book examines the legal foundations that govern military activities in outer space, the protection and status of space objects, the involvement of non-state actors and their responsibilities, and the strategic considerations that shape the space policies of NATO and the European Union. This publication was created as part of the Hubert Curien/Balaton Programme, in collaboration between the Institute of Aerospace and Telecommunications Law (Ludovika University of Public Service, Budapest) and the Institute of Space and Telecommunications Law (Université Paris-Saclay).

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