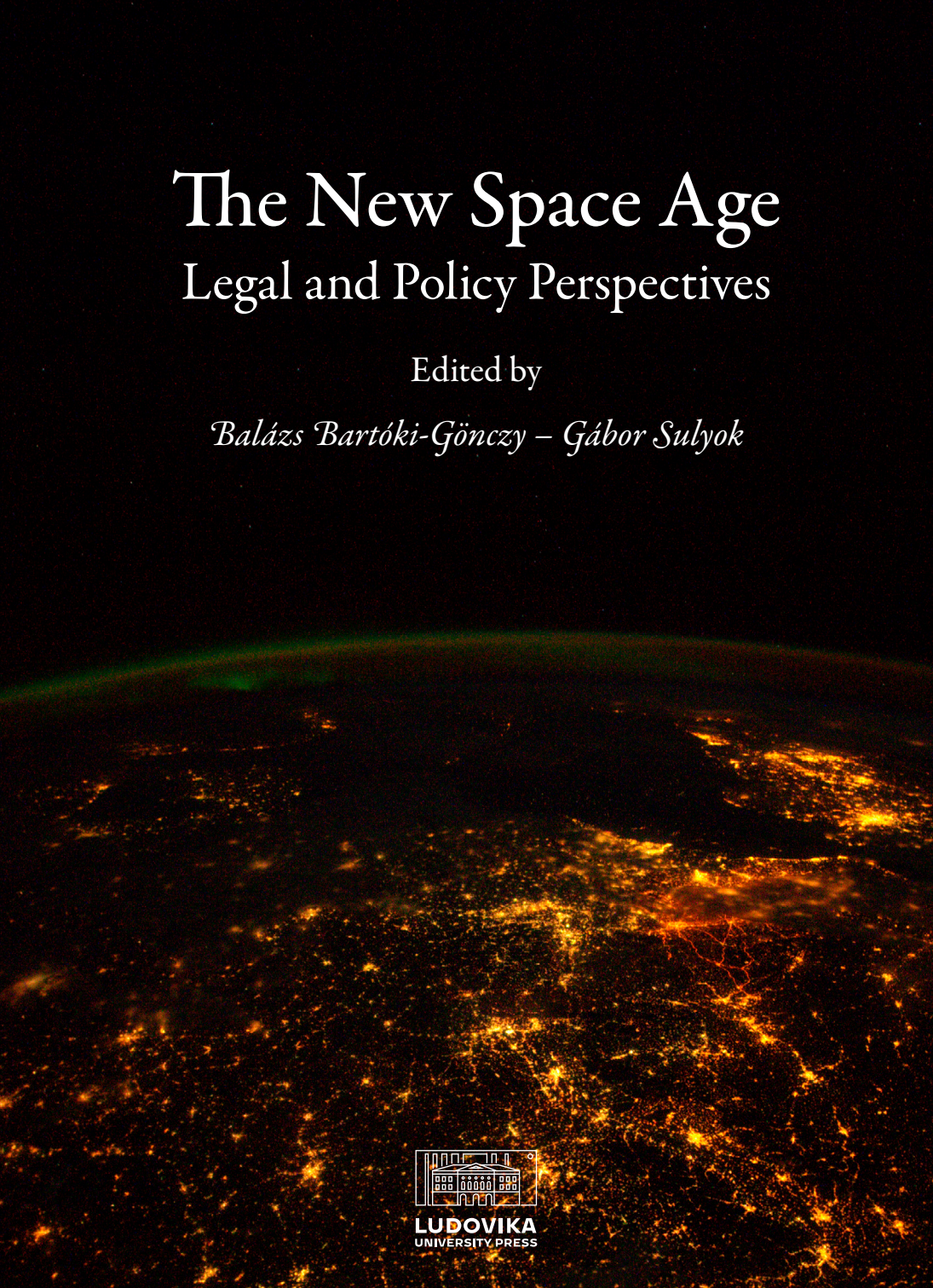
The New Space Age
Legal and Policy Perspectives

Edited by

Balázs Bartóki-Gönczy – Gábor Sulyok



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INTRODUCTION

Humankind began to make use of airspace, outer space and cyberspace in the course of a single century. While the rapid development of science and technology has opened up unprecedented opportunities for human civilisation, it should not be forgotten that each of these three domains can be put to offensive and defensive military use. Nowadays, outer space is arguably the "most peaceful" of these domains, but this situation could easily change if the intensifying new space race takes an unfavourable turn. The headlines reveal increasing turmoil on the world stage. For example, SpaceX has provided vital technological support to Ukraine's self-defence by rapidly granting access to its Starlink megaconstellation service, but it also caused considerable controversy when its chief executive officer refused to activate the service over the Crimean peninsula, preventing Ukraine from launching a major drone strike on the Russian naval fleet, and limiting the legitimate freedom of action of the attacked state. There have also been reports of measures taken in self-defence in outer space for the first time, with the Israel Defense Forces' "Arrow/Hetz" missile defence system intercepting an incoming ballistic missile. Meanwhile, the United States is reportedly considering ways to compensate private companies in case their satellites being used for military purposes are targeted in an armed conflict.[1] For these reasons, the present chapter seeks to introduce and examine selected issues relating to the exercise of the right of individual or collective self-defence in outer space.

[1] Isaacson 2023; Mizokami–Roblin 2023; Erwin 2022.

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THE RIGHT OF INDIVIDUAL OR COLLECTIVE SELF-DEFENCE

Every legal system recognises the right of self-defence. The conditions and extent to which self-defence is permitted depends on the level of development of the legal system concerned. The actual role and importance of self-defence is inversely proportional to the degree of centralisation of the sanctions regime that ensures the effective enforcement of the provisions of the law.[2] The same holds true for contemporary international law, where the right of individual or collective self-defence has, after centuries of historical development, been recognised as one of the exceptions to the comprehensive, objective and peremptory prohibition of the threat or use of force.[3] The detailed rules are contained in the Charter of the United Nations (UN) and in customary international law. Article 51 of the UN Charter provides:

> "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."[4]

This is undoubtedly one of the most famous provisions of the UN Charter. Remarkably, the article was included in the treaty text at a rather late stage, during the San Francisco Conference. Previously, self-defence had been regarded as a right that all States took for granted and that could safely be omitted from treaties. U.S. Secretary of State Frank B. Kellogg had even famously stated: "That is an inherent right of every sovereign, as it is of every individual, and it

[2] Bowett 1958: 3–4.
[3] Charter of the United Nations, Article 2 (4).
[4] Charter of the United Nations, Article 51.

is implicit in every treaty."[5] This approach permeated treaties on the limitation and prohibition of war concluded between the two world wars. However, with the advent of the prohibition of the threat or use of force, and the establishment of a new collective security organisation, the Latin American states wished to ensure that their regional system of mutual assistance based on the Act of Chapultepec would not be considered contrary to the UN Charter.[6]

The UN Charter recognises the right of individual or collective self-defence as an "inherent right", which can be interpreted as a reference either to natural law, state sovereignty or customary international law.[7] There is a strong case for the last of these interpretations. However, if the expression "inherent right" is understood to refer to the relevant rules of customary international law, which are not "impaired" by the provisions of the UN Charter, the question arises: How do the Charter-based and customary rights of individual or collective self-defence relate to each other? Keeping in mind that in traditional international law, the right of self-defence permitted, *inter alia,* pre-emptive strikes, the timeliness and importance of this question scarcely require further explanation. It should be noted that the International Court of Justice has consistently interpreted "inherent right" as a reference to the relevant rules of customary international law, the content of which is essentially identical to that of the UN Charter. Having said that, this parallelism does not imply an exact overlap between them or completely identical content.[8]

The "overture" of the exercise of the right of self-defence is an "armed attack". Since the UN Charter does not define the concept of armed attack, external and subsidiary sources of interpretation must be consulted in order to reveal the meaning of that term. Based on state practice and the relevant literature,

[5] *Hearings Before the Committee on Foreign Relations, United States Senate, Seventieth Congress, Second Session on the General Pact for the Renunciation of War, signed at Paris August 27, 1928. December 7 and 11, 1928. Part 1.* 1928: 4.

[6] Mori 2018: 219–223. See also, Final Act of the Inter-American Conference on Problems of War and Peace, Mexico City, 8 March 1945, 60 Stat. 1831, TIAS 1543.

[7] Kajtár 2015: 62–72.

[8] Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America), Judgment of 27 June 1986, ICJ Reports 1986: 94.

it appears that two criteria, a quantitative and a qualitative element, must be met for an armed attack to occur: the quantitative element relates to the gravity and intensity of the armed attack, while the qualitative element relates to the perpetrator of the armed attack.[9] From a quantitative point of view, an armed attack is the gravest and most intensive form of the use of force and, as such, it is in a part–whole relationship with the concept of aggression. However, it is impossible to formulate a precise and universal yardstick, as each case must be assessed individually. It is conceivable that a singular act could surpass the gravity and intensity threshold, but it is equally conceivable that a series of attacks of lesser gravity constitutes an armed attack in accordance with the debated theory of "accumulation of events".[10] In some views, even placing territory at the disposal of another State may constitute an armed attack.[11] However, isolated violent acts of minor gravity cannot be considered armed attacks even when they result in the loss of life.[12] Nowadays, armed attacks can also be carried out in cyberspace.[13] It should be emphasised that the type of weapons used is irrelevant for the purposes of determining whether an armed attack occurred, and such an attack may even be committed by means that are normally not considered weapons.[14]

From a qualitative point of view, only conduct attributable to a State can be considered an armed attack.[15] Notwithstanding that scholarly consensus is lacking as to how such attributability is to be determined,[16] this should arguably

9 Kajtár 2015: 73.

10 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.

11 Randelzhofer–Nolte 2012: 1414.

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

13 Schmitt 2017: 339, 341–343.

14 Zemanek 2012: 599.

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

16 Kajtár 2015: 173–219, 256–257.

be performed in accordance with the rules of international law concerning the responsibility of States. Similarly to an act of aggression, an armed attack can be carried out either directly or indirectly. In case of a direct armed attack, the act is carried out by a State, while an indirect armed attack is carried out by a person or a group of persons acting on the instructions of, or under the direction or control of a State.[17] There are divergent approaches as to the degree of control required over an attack for it to be attributable. The International Court of Justice requires "effective control",[18] while the International Criminal Tribunal for the former Yugoslavia, for the purposes of individual criminal responsibility, only required "overall control".[19] Furthermore, it is also matter of debate whether attacks carried out by non-state actors that are not attributable to any State can be considered armed attacks. This is perhaps the most important dilemma today concerning the right of self-defence. While it would stray from the present topic to engage in a detailed discussion of the related problems, it should be noted that the arguments in favour of self-defence against non-state actors do not appear to be entirely convincing. The same holds true for the so-called "unwilling or unable" doctrine.[20]

The UN Charter makes it clear that the victim of an armed attack is a State.[21] An armed attack may be carried out either in or against the territory of a State

[17] Responsibility of States for Internationally Wrongful Acts, Article 8. In Yearbook of the International Law Commission, 2001. Vol. II. Part Two, U.N. Doc. A/CN.4/SER.A/2001/Add.1 (Part 2), 26.

[18] 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.

[19] Prosecutor v. Duško Tadić, Judgement of 15 July 1999, Case No. IT-94-1-A, 47–62.

[20] Letter dated 23 September 2014 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General, U.N. Doc. S/2014/695.

[21] The International Law Commission proposed that certain international organisations may also be placed in a situation of self-defence, but has not provided details as to how this may happen. Draft Articles on the Responsibility of International Organizations, Article 21. In Yearbook of the International Law Commission, 2011. Vol. II. Part Two, U.N. Doc. A/CN.4/SER.A/2011/Add.1 (Part 2), 40.

or, as the case may be, against persons or objects representing a State outside its territory.[22] The determination of whether an armed attack has occurred is primarily based on the subjective assessment of the attacked State, and the burden of proof also rests on that State.[23] If the furnishing of direct evidence is precluded by the sovereignty of another State, even "a more liberal recourse to inferences of fact and circumstantial evidence" may be sufficient.[24] Nevertheless, the attacking State and other members of the international community are also likely to present their respective appraisals of the situation based of their subjective assessments. The UN Security Council is arguably capable of making a credible and objective determination, but such a determination by the principal organ bearing primary responsibility for the maintenance of international peace and security is certainly not a prerequisite for the exercise of the right of self-defence. In addition, its findings unavoidably lag behind the assessments made by the States concerned, and any such action is subject to the veto power of the permanent members. In any case, a peculiar situation would arise if the council happened to find that, contrary to the claim of the victim, no armed attack had occurred.[25]

If an armed attack occurs, the attacked State is placed in a situation of self-defence, and may have recourse to force in order to repel the attack lawfully, without violating the prohibition on the threat or use of force. This is the traditional case of self-defence. Even though it is not explicitly mentioned in the UN Charter, the same holds true for interceptive/interceptory self-defence, that is, for the use of force to repel an armed attack that has been launched but which has not yet struck its target. However, the use of force in anticipatory self-defence is prohibited: neither pre-emptive actions against concrete and imminent threats, nor preventive actions against abstract and remote threats

[22] Ruys 2010: 199–249.

[23] Oil Platforms (Islamic Republic of Iran v. United States of America), Judgment of 6 November 2003, ICJ Reports 2003, 189.

[24] The Corfu Channel Case (United Kingdom v. Albania), Judgment of 9 April 1949, ICJ Reports 1949, 18.

[25] Kelsen 1951: 798–800, 803–804.

are permitted under current international law. Having said that, the international community would probably not condemn the unilateral use of force in extreme cases of pre-emptive self-defence when waiting for the actual launch of an imminent armed attack would be unexpectable and unreasonable.[26] In the absence of an armed attack having been launched or having occurred, the right of self-defence cannot be invoked and exercised. Hence, violent actions not amounting to an armed attack cannot be met with violence, and the victim must resort, as appropriate, to other international procedures or measures in the face of these.[27]

In spite of the protection of vital interests and its function as a circumstance precluding wrongfulness,[28] the exercise of the right of self-defence does not provide unlimited freedom of action. Some of its most important conditions, including necessity and proportionality, are governed by customary international law, and were embodied in traditional international law in the so-called "Webster formula".[29] Nowadays, measures taken in self-defence meet these requirements only if other reasonable and effective solutions are not available, and provided that force is used as a last resort with no intention of retaliation, punishment or prevention. Generally speaking, measures taken in self-defence must be proportionate to the gravity and intensity of the armed attack. The fulfilment of this requirement is notoriously difficult to assess, since the success of a defensive act always presupposes a degree of effectiveness that exceeds that of the attack.[30] Proportionality demands full respect for the law of armed conflicts. However, there are open questions in this regard. For example, it is impossible to reach a definitive conclusion as to whether the use of nuclear weapons is permissible in extreme circumstances of self-defence, in which the survival of a State is at stake.[31] Immediacy of action is occasionally mentioned as a third

[26] Kajtár 2015: 98–102.
[27] Randelzhofer–Nolte 2012: 1401–1403.
[28] Responsibility of States for Internationally Wrongful Acts, Article 21.
[29] *The Diplomatic and Official Papers of Daniel Webster* 1848: 132.
[30] Greenwood 2012: 109.
[31] Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion of 8 July 1996, ICJ Reports 1996, 245, 263.

requirement, but a scholarly consensus is lacking in that regard. Nevertheless, the time factor is admittedly important, as the requirement of necessity also implies that measures taken in self-defence must follow the armed attack within a reasonable period of time.[32] Furthermore, the occurrence of a situation of self-defence and the taking of measures in the exercise of the right of self-defence must be immediately reported to the Security Council. This is a Charter-based obligation which does not exist in customary international law. Failure to report a defensive act does not affect the lawfulness of the exercise of the right of self-defence. However, the fulfilment of this obligation is an important testimony of the attacked State's assessment of the situation.[33]

The UN Charter assigns self-defence a temporary and complementary role. It permits the use of force in the exercise of the right of self-defence, but it does not in any way affect the primary responsibility of the Security Council for the maintenance of international peace and security.[34] For that reason, the exercise of the right of self-defence lasts only "until the Security Council has taken measures necessary to maintain international peace and security". The activation of the mechanism of collective security terminates the exercise of the right of self-defence, and replaces it by the actions of the organisation. However, it is not entirely clear who has the power to determine that the "necessary measures" have indeed been taken by the Security Council, and on what basis.[35] The justification for the right of self-defence also ends when the attacked State successfully repels the armed attack and restores the *status quo ante*. In practice, this is not always a self-evident or objective limitation. The restoration of the situation which prevailed prior to the armed attack and the successful repulsion of the attacker do not necessarily result in satisfactory conditions from a military and security point of view. Keeping that in mind, measures taken in self-defence may become excessive, and may constitute a violation of international law.

[32] Dinstein 2017: 252, 267, 287, 299.

[33] Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America), Judgment of 27 June 1986, ICJ Reports 1986: 105.

[34] Charter of the United Nations, Article 24 (1) and (2).

[35] Kelsen 1951: 800–803.

The right of self-defence can be exercised either individually or collectively. The latter alternative, collective defence, has played an essential role ever since the dawn of history. It means that the attacked State is not left to its own devices against the attacker, but may request and receive external assistance to repel an armed attack.[36] This assistance includes military assistance insofar as it is provided in accordance with the requirements discussed above. Such assistance may be provided on the basis of a collective defensive arrangement concluded before an armed attack or based on an *ad hoc* arrangement concluded after an armed attack. Treaties providing for assistance in case of an armed attack transform the right of collective defence into an obligation.

THE MILITARY USE OF OUTER SPACE

The casual observer might be inclined to think that, by virtue of international law, outer space is an endless sea of quietude, which can be used exclusively for peaceful purposes. This perception should be nuanced. Indeed, the exploration, use and scientific investigation of outer space, having the status of *res communis* or global commons, may be freely pursued by all States on the basis of equality, must be pursued for the benefit and in the interest of all countries, and must be regarded as a common province of mankind. These activities must be conducted in accordance with international law, in the interest of international peace and security and international cooperation and understanding.[37] Nevertheless, space law does not provide a definition of "peaceful use". Initially, two divergent interpretations emerged, maintaining that it means either "non-military use" or "non-aggressive use".[38] Nowadays, there is little doubt that it should be

[36] Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America), Judgment of 27 June 1986, ICJ Reports 1986: 102–105.

[37] 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), London, Moscow, Washington, 27 January 1967, 610 UNTS 205, Articles I–III. See also, GA Res. 1962 (XVIII), 18 UN GAOR Suppl. No. 15 (A/5515), 15.

[38] Cheng 1997: 513–516.

interpreted in the latter sense, and that military activities are not completely prohibited in outer space. The militarisation/passive military use of outer space is permitted, as shown by consistent state practice since the beginning of the space age. The weaponisation/active military use of outer space, on the other hand, is subject to strict limitations. The partial demilitarisation of outer space is primarily based on the Outer Space Treaty, the Moon Agreement and selected disarmament and arms control treaties.

The Outer Space Treaty provides that nuclear weapons or any other kinds of weapons of mass destruction may not be placed in orbit around the Earth, installed on celestial bodies, or stationed in outer space in any other manner.[39] This prohibition sought to preserve the doctrine of "mutual assured destruction", and prompted U.S. President Lyndon B. Johnson to the describe the treaty as "the most important arms control development since the limited test ban treaty of 1963".[40] The provision concerned was reaffirmed and expanded by the Moon Agreement. The latter agreement provides that nuclear weapons or any kinds of weapons of mass destruction may not be placed or used on or in the Moon or other celestial bodies in our Solar System, or placed in orbit around or on another trajectory to or around them.[41] However, these prohibitions do not apply to the testing or use of Earth-based weapons of mass destruction that temporarily enter and traverse outer space on their way to their intended targets, and arguably do not apply to weapons of mass destruction that do not complete at least one full orbit around our planet either. (There is no consensus on this latter point.[42]) The relevant weapons or weapon systems include, for example, ballistic missiles with nuclear warheads, fractional orbital bombardment systems and certain nuclear-capable hypersonic glide vehicles. Ballistic missiles are widely

[39] Outer Space Treaty, Article IV. See also, GA Res. 1884 (XVIII), 18 UN GAOR Suppl. No. 15 (A/5515), 13.

[40] President Johnson Hails U.N. Accord on Treaty Governing Exploration of Outer Space 1966: 952.

[41] Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (hereinafter: Moon Agreement), New York, 5 December 1979, 1363 UNTS 3, Articles 1 (1)–(2) and 3 (3).

[42] Schrogl–Neumann 2017: 309.

known and hardly require a detailed explanation: beyond a specific launch angle and range, a section of the trajectory of these missiles passes through outer space. Fractional orbital bombardment systems were developed to provide the capability to carry out a barely detectable, rapid and global nuclear strike through outer space from any direction. Here a nuclear warhead is placed in low Earth orbit, but is de-orbited and aimed at the target before it has completed a full orbit around the planet. Deployed during the Cold War, these weapon systems were subsequently banned and decommissioned. Hypersonic glide vehicles are advanced weapons systems, designed to perform a barely detectable and prompt global strike. Notwithstanding that these ultrafast, manoeuvrable vehicles may also pass through outer space and may carry a nuclear warhead, they are not placed in Earth orbit, and as such, are not prohibited by space law. Space law does not prohibit the testing or use of nuclear weapons either, insofar as these activities do not entail placement, installation or stationing in outer space, and do not affect the Moon or other celestial bodies. The testing and use of nuclear weapons in outer space is extremely dangerous. High-altitude nuclear tests, such as Starfish Prime and Test 184 of Project K, have shown that a nuclear explosion in outer space at the right altitude and with an appropriate yield would produce an artificial radiation belt and an electromagnetic pulse which could indiscriminately damage beyond repair or disable any unshielded electronic system on a continental scale and/or in low Earth orbit. Recently, concerns have been raised over a possible emergence of nuclear space weapons and a re-emergence of fractional orbital bombardment systems.

These shortcomings have been and are being remedied by various disarmament and arms control treaties: the use of nuclear weapons and other nuclear explosive devices is prohibited by the Treaty on the Prohibition of Nuclear Weapons,[43] nuclear test explosions beyond the limits of the atmosphere are prohibited by the Partial/Limited Test Ban Treaty and the Comprehensive

[43] Treaty on the Prohibition of Nuclear Weapons (TPNW), New York, 7 July 2017, I-56487, Article 1.

Nuclear Test Ban Treaty,[44] fractional orbital bombardment systems were prohibited, on a bilateral basis, by the Treaty on the Limitation of Strategic Offensive Arms and the Treaty on the Reduction and Limitation of Strategic Offensive Arms,[45] and are to be prohibited by the Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects.[46] Of these, the Treaty on the Prohibition of Nuclear Weapons and the Partial/Limited Test Ban Treaty are the only treaties that are in force, since the Comprehensive Nuclear Test Ban Treaty has not entered into force yet, the bilateral arms control treaties have expired, and no progress has been made on the rather controversial draft treaty. The effectiveness of the prevailing legal regime is diminished by the fact that the nuclear weapon states and their close allies do not participate in the Treaty on the Prohibition of Nuclear Weapons. Selected ballistic missiles were banned by the Treaty on the Elimination of Intermediate-Range and Shorter-Range Missiles until its termination.[47] As for other types of weapons of mass destruction, chemical and biological weapons are totally prohibited,[48] while radiological weapons

[44] Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (Partial/Limited Test Ban Treaty, PTBT/LTBT), 480 UNTS 43, Moscow, 5 August 1963, Article I; Comprehensive Nuclear Test Ban Treaty, New York, 10 September 1996, Article I.

[45] Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Strategic Offensive Arms (SALT II), Vienna, 18 June 1979, Articles VII (Second Common Understanding) and IX (1) (c); Treaty between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms (START I), Moscow, 31 July 1991, Article V (18) (c).

[46] Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT), 12 June 2014, Doc. CD/1985, Article I (c) and II.

[47] Treaty between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles (INF Treaty), Washington, 8 December 1987, 1657 UNTS 2, Article I.

[48] Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, Geneva, 17 June 1925, 94 LNTS 65; Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, London, Moscow, Washington, 10 April 1972, 1015 UNTS 163, Articles I–IV; Convention on the

are yet to be prohibited by a dedicated treaty. In addition, the international community formulated a politically-binding International Code of Conduct against Ballistic Missile Proliferation.[49] It should be noted that if ballistic missiles or hypersonic glide vehicles carry conventional warheads, they should be treated as conventional weapons.

The Outer Space Treaty provides that the Moon and other celestial bodies can be used exclusively for peaceful purposes. This is a remarkable limitation. No military bases, installations or fortifications may be established on any of the celestial bodies under the terms of the treaty. Military manoeuvres and the testing of weapons on celestial bodies are likewise prohibited.[50] The Moon Agreement reaffirms and extends this prohibition by adding bans on any threat or use of force or any other hostile act or threat of hostile act on or using the Moon, or making such a threat in relation to the Earth, the Moon, spacecraft, spacecraft personnel or man-made space objects.[51] It should be recalled that the scope of the Moon Agreement covers all celestial bodies in our Solar System, unless separately governed. For these reasons, conventional weapons may not be placed on any celestial body.

The deployment and testing of conventional weapons, on the other hand, is allowed in Earth orbit and in the void of space. The Treaty on the Limitation of Anti-Ballistic Missile Systems had previously contained bilateral restrictions to that effect, but that agreement was terminated more than two decades ago.[52] Notwithstanding the fact that conventional weapons have not been deployed on a large scale in outer space, such weapons have actually been developed and/

Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (with Annexes), Paris, 13 January 1993, 1974 UNTS 45, 1975 UNTS 3, Article I.

49 The Hague/International Code of Conduct against Ballistic Missile Proliferation, The Hague, 25 November 2002, U.N. Doc. A/57/724, Annex.

50 Outer Space Treaty, Article IV.

51 Moon Agreement, Articles 3 (1)–(2) and (4).

52 Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems (ABM Treaty), Moscow, 26 May 1972, 944 UNTS 13, Article V (1).

or have occasionally travelled beyond the limits of the atmosphere. Examples include the Rikhter R-23M space cannon and the TP-82/TOZ-82 SONAZ cosmonaut combination gun. In addition, certain secretive experimental spaceplanes and satellites, such as the Boeing X-37B OTV and the "Shenlong"/CSSHQ spaceplanes, or the Kosmos-2521 and Kosmos-2543 satellites, are also believed to have at least partly military purposes. However, the range of ideas that have been or are being pursued is much broader than this, and includes a number of offensive or defensive weapons or weapon systems: kinetic weapons (kill vehicles, projectile launchers, docking mechanisms, robotic arms, co-orbital anti-satellite missiles, rail guns, coil guns, chemical or paint spraying mechanisms, deflected meteoroids, hypervelocity rod bundles), directed energy weapons (sun gun/heliobeam, laser weapons, particle beam weapons, plasma weapons, high-energy microwave weapons, electromagnetic pulse weapons), electronic warfare (jamming, spoofing, meaconing, signal intrusion), cyber operations (data interception, data monitoring, data corruption, seizure of control) and manned military spaceplanes.[53] Famous experimental examples of the latter include the Boeing X-20 "Dyna-Soar" and the MiG-105 "Lapot". In addition, basically any manoeuvrable satellite can be used to cause kinetic destruction by direct impact. Satellites and space stations which can conduct passive military activities are also allowed. Numerous military and dual-use satellites perform surveillance, reconnaissance, intelligence, early warning, positioning, navigation, timing, communication and Earth observation missions. In the past, military space stations, launched within the framework of the Soviet "Almaz" programme, have also orbited our planet. It should be noted that the use of military personnel or any equipment or facility necessary for scientific research or any other peaceful purposes is also explicitly allowed.[54]

The provisions concerned do not prohibit conventional Earth-based weapons or weapon systems. The Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects does not seek to prohibit such weapons or weapon systems either,

[53] Preston et al. 2002.

[54] Outer Space Treaty, Article IV; Moon Agreement, Article 3 (4).

an approach that has attracted a great deal of criticism, instead it would only prohibit their use for offensive purposes.[55] Nowadays, only a handful of States have direct ascent anti-satellite capabilities that have been demonstrated by their past and recent tests. The problem these capabilities pose should not be underestimated, as some of the destructive tests have resulted in large clouds of space debris. Even though these tests are not directly in breach of the military provisions of the Outer Space Treaty, they are extremely hard to reconcile with other provisions of that treaty or with the space debris mitigation standards. Destructive direct ascent anti-satellite missile tests constitute irresponsible behaviour in outer space,[56] and the UN General Assembly has urged all States to commit not to engage in such activities.[57] The number of countries that have declared a voluntary moratorium on such tests is continuously increasing,[58] and their efforts have received support from stakeholders in the industry.[59] However, there are other threats that also need to be addressed. For example, States or non-state actors can easily come into possession of the means necessary to direct electronic attacks or cyberattacks against satellites. By virtue of their location, these means are not in breach of the military provisions of the Outer Space Treaty, but they are also hard to reconcile with other provisions of that treaty or with the legal regime of the International Telecommunication Union.

The States concerned have hitherto refrained from deploying conventional weapons on a large scale in outer space, and seem to have been content with the passive military use thereof. However, the prevailing situation is susceptible to change at any moment in light of the intensifying new space race and the increasing need to safeguard the security of space objects. This possibility

[55] Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects, Article II.

[56] GA Res. 75/36, 75 UN GAOR Suppl. No. 49 (A/75/49) (Vol. I), 238; Reducing Space Threats Through Norms, Rules and Principles of Responsible Behaviours. Report of the Secretary-General, 13 July 2021, U.N. Doc. A/76/77, 6, 8–9.

[57] GA Res. 77/41, 77 UN GAOR Suppl. No. 49 (A/77/49) (Vol. I), 225.

[58] Secure World Foundation 2023.

[59] Space Industry Statement in Support of International Commitments Not to Conduct Destructive Anti-Satellite Testing, 14 November 2023.

is reflected in the military doctrines and strategies of the main players concerned.[60] The extreme dangers inherent in the weaponisation of outer space have, of course, been recognised by the international community, and the overwhelming majority of States have been urging the prevention of an arms race in outer space for decades, so far without any tangible results.[61]

INDIVIDUAL OR COLLECTIVE SELF-DEFENCE IN OUTER SPACE

Since the prohibition of the threat or use of force is universal and peremptory, the right of individual or collective self-defence, recognised as an exception to that prohibition, also applies in outer space, irrespective of the meaning attributed to the "peaceful use of outer space".[62] This is attested, *inter alia,* by the reference to the UN Charter in the Outer Space Treaty, by the reference to the UN Charter and the UN General Assembly's Friendly Relations Declaration in the Moon Agreement, and by the reference to the right of individual or collective self-defence in the European Union's (EU) Draft International Code of Conduct for Outer Space Activities and 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.[63]

Theoretically, the right of self-defence can be exercised anywhere in outer space, without territorial restrictions. This state of affairs could only be

[60] Bingen et al. 2023: 8–32.

[61] GA Res. 36/97C, 36 UN GAOR Suppl. No. 51 (A/36/51), 71; GA Res. 69/32, 69 UN GAOR Suppl. No. 49 (A/69/49) (Vol. I), 242, and subsequent resolutions. See also Lattmann 2017: 171–187.

[62] Lachs 2010: 98, Jakhu–Freeland 2022: 22.

[63] Outer Space Treaty, Article III; Moon Agreement, Article 2; Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects, Article IV; Draft International Code of Conduct for Outer Space Activities, 31 March 2014, paras. 2. and 4.2. For the Friendly Relations Declaration, see GA Res. 2625 (XXV), 25 UN GAOR Suppl. No. 28 (A/8028), 121.

modified by a subsequent norm of general international law having a peremptory character.[64] However, if the provisions of the Outer Space Treaty and the Moon Agreement on the complete demilitarisation of celestial bodies are to be regarded as peremptory norms, an opinion which has indeed been expressed in the literature,[65] then self-defence can only be exercised with the modifications and territorial restrictions emanating therefrom. Furthermore, provisions on the territorial scope of collective defensive arrangements, such as the Inter-American Treaty of Reciprocal Assistance, the North Atlantic Treaty or the Collective Security Treaty,[66] are also of interest here. These treaties were formulated with an armed attack taking place on the Earth in mind; therefore, their application in the case of an armed attack in outer space may pose an interpretative challenge.[67] Nevertheless, these dogmatic considerations will certainly not keep members of these alliances from taking the necessary measures if the right of self-defence needs to be exercised in outer space. For example, the North Atlantic Treaty Organization has recognised outer space as a new operational domain, and has declared that attacks to, from, or within space could lead to the invocation of Article 5 of the North Atlantic Treaty.[68]

It is possible to identify five different scenarios, depending on the possible directions of attack, in which an armed attack involves outer space. An armed attack may be launched from the Earth against a target in outer space; from outer space against a target on the Earth, from outer space against a target in outer space; from the Earth through outer space against a target on the Earth; or from the Earth and/or outer space against targets on the Earth and in outer space simultaneously. While each scenario is conceivable or feasible, at

64 Vienna Convention on the Law of Treaties, Vienna, 23 May 1969, 1155 UNTS 331, Article 53.

65 E.g. Bourbonnière–Lee 2008: 878–880; Sachdeva 2017: 22–24, 26.

66 Inter-American Treaty of Reciprocal Assistance, Rio de Janeiro, 2 September 1947, 21 UNTS 77, Articles 3 (3), 4 and 6; North Atlantic Treaty, Washington, 4 April 1949, 34 UNTS 243, Articles 5–6; Treaty on Collective Security, Tashkent, 15 May 1992, 1894 UNTS 309, Articles 4 and 6.

67 E.g. Martin 2020: 33.

68 See London Declaration, 3–4 December 2019, NATO Press Release (2019) 115, para. 6; Brussels Summit Communiqué, 14 June 2021, NATO Press Release (2021) 086, para. 33.

present, an attack from the Earth through outer space against a target located on the Earth, or an attack from the Earth and/or outer space against targets located on the Earth and in outer space simultaneously seem to be the most likely. Presuming that the actors concerned are rational, an armed attack always seeks to bring about a change on our planet, in the world of States. Therefore, in the current situation, outer space is likely to remain a secondary theatre of operations, primarily used to deliver ballistic missiles or to neutralise the adversary's "force multipliers". However, the prevailing situation is susceptible to change with the intensification of the use of outer space.

If an armed attack is launched from outer space against a target on the Earth or from the Earth through outer space against a target on the Earth, there should be little difficulty in establishing the existence of the quantitative element of the armed attack: the gravity and intensity of the action should be assessed in the "traditional" way, in the light of the force used and/or the destruction caused, taking into account analogous historical experiences. It should be pointed out that an armed attack from the Earth through outer space against a target on the Earth is, regardless of its likelihood, the least relevant case from the perspective of space law, as the means used for the purposes of such attacks only traverse outer space without completing at least one full orbit around our planet. Such attacks are usually excluded from the notion of "space warfare". Furthermore, it should be noted that the use of military or dual-purpose satellites or space stations for passive military purposes cannot be considered an armed attack from outer space. Even if such space objects are used in support of an attack, their "force multiplying" role cannot be qualified as a kind of "aggravating circumstance". The passive support of space-based assets, in itself, does not make an armed attack more serious. On the contrary, precision strikes enabled by military satellites may even reduce the gravity and intensity of the use of force.

If an armed attack is launched from the Earth against a target in outer space, or from outer space against a target in outer space, a range of factors complicate the assessment of the gravity and intensity of the action. For example, many complex questions need to be answered regarding the space object that

was attacked. What was the purpose and significance of the space object? Was it a military, civilian or dual-use space object? How many space objects were attacked? Can the space object be substituted? What is the value of the space object? Historical experiences, which could in other instances be used as an analogy, do not facilitate the answering of these questions. Universal benchmarks cannot be formulated either, but the following short remarks may provide guidelines for arriving at a correct assessment. First, the importance attributed to a space object is based on the subjective judgement of the parties, but the importance of certain space objects definitely outweighs that of others. Suffice it to recall the obvious differences between the importance of a single satellite in a megaconstellation providing a global internet service and an exquisite early warning satellite or a national or international space station. Second, similarly to terrestrial targets located outside the territory of a State, the military, civilian or dual-use nature of a space object should also be taken into account. Space objects used for exclusively civilian purposes raise particularly difficult questions. Which of these are the external manifestations of a State that, if attacked, may result in a situation of self-defence? Is there an analogy between an attack on a civilian space object and an attack on a civil aircraft or a merchant vessel? What are the implications of the attack on a civilian space object for the State? Third, the number of space objects attacked may also be important. The International Court of Justice has not excluded the possibility that the striking of a mine by a single warship could result in a situation of self-defence.[69] Hence, the destruction of or serious damage to a single space object, under certain circumstances, could also constitute an armed attack, although this appears to be an exceptional case. The greater the number of space objects attacked, the easier it is to prove that the quantitative element prevails.

However, this correlation is subject to a constraint: the greater the number of space objects performing a similar function, the lower the probability that the quantitative criterion prevails. For example, in case of megaconstellations consisting of hundreds or thousands of satellites, the level of destruction

[69] Oil Platforms (Islamic Republic of Iran v. United States of America), Judgment of 6 November 2003, ICJ Reports 2003, 195.

required to reach the gravity and intensity of an armed attack would be so high that the likelihood of actually achieving that level is rather low. Considerations of military necessity, cost effectiveness and rationality would probably be against such an attack. This also holds true for small satellites. Finally, the value of the space object attacked and the extent of damage caused should also be taken into account. The International Court of Justice, as has been noted, held that even an attack on a single warship could result in a situation of self-defence. This statement was made in the context of heavy structural damage caused by a sea mine to a U.S. Navy Oliver Hazard Perry-class guided missile frigate, the USS Samuel B. Roberts. No lives were lost in the incident, but several sailors were seriously injured. The crew managed to keep the ship afloat, and the vessel was subsequently repaired. Frigates of the Oliver Hazard Perry-class had been produced and commissioned in large numbers at a reasonable cost. The average unit cost of the class concerned, even taking inflation into account, is below the cost of some of today's exquisite military satellites.

The nature of acts capable of constituting an armed attack also requires scrutiny. Intentional destruction, damaging or disruption may evidently exhaust the concept of armed attack. This is attested, among others, by the Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects. The draft treaty adds that acts carried out by a State at the express request of another State, on the basis of a special agreement, in order to discontinue the uncontrolled flight of space objects under the jurisdiction and/or control of the requesting State are not to be regarded as a use of force, and as such, as an armed attack.[70] While the destruction or damaging of an adversary's space objects may seem an obvious solution, the peculiarities of the space environment make such acts the least favourable methods of warfare. Destroying or damaging space objects would generate a staggering amount of space debris of various sizes, threatening the safety of space activities for various amounts of time. The higher the altitude, the longer a piece of space debris remains in orbit. If the destruction or damaging

[70] Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects, Article I (d).

of space objects had widespread, long-lasting or severe effects, it could even be considered an environmental modification technique prohibited by the law of armed conflicts, and could easily bring about the dreaded "Kessler syndrome": a catastrophic scenario where space debris generated by collisions in a crowded orbit leads to a self-sustaining cascade of collisions generating even more space debris.[71] Since space debris threatens a state's own objects just as much as it threatens hostile and third party space objects, a reasonable actor would probably strive to employ methods other than destruction and damaging. (This consideration may be formulated as a proportionality requirement.) Plausible alternatives, for example, include jamming, blinding, cyberattacks against or other non-kinetic disruption of the normal functioning of satellites. These are partly based on existing and proven technology. Nevertheless, if a manoeuvrable satellite becomes unable to make orbital corrections as a result of a non-kinetic attack, this may also contribute to the creation of space debris due to perturbation and/or in-orbit collisions. It should be noted that if the jamming of satellite communications is not carried out in preparation for an armed attack, or it is not accompanied by such an attack or by sufficient physical damage, it is normally not considered an armed attack.

The identification of the victim of an armed attack is not without challenges either. The difficulties related to identification are mainly due to the specificities of the launching, registration, ownership and use of space objects. It should be stressed that such difficulties are not bound to arise: the victim of an armed attack on an exquisite satellite carrying out a sensitive military mission should not be hard to identify. However, it is not difficult to imagine complex situations arising. For example, who is the victim of an armed attack in the event of the destruction, damaging or disruption of an unregistered satellite launched by a State from the territory of another State using a third State's launch vehicle, the services of which are used by a multitude of other States, one of which leases capacity for the purposes of military communications? This hypothetical question can be further complicated, but it perhaps suffices to

[71] Kessler – Cour-Palais 1978: 2637–2646.

illustrate the potential difficulties of identifying a victim. The answer appears to be disturbingly complicated in theory, but would probably be simpler in practice. Since an armed attack always seeks to bring about a change on the planet, in the world of States, the course of events will rapidly reveal the actual victim of the armed attack.

This remark leads to the last scenario to be discussed. If an armed attack from the Earth and/or outer space is directed against targets simultaneously on the Earth and in outer space, determining whether the quantitative element prevails is arguably less challenging than in case of an attack against a target located in outer space. In this situation, the assessment of the gravity and intensity of the action should at least partly be performed in the "traditional" way, and the theory of "accumulation of events" may also play a significant role.[72]

The qualitative element of an armed attack is to be determined on the basis of the rules on the responsibility of States under international law. The attribution of an act is normally governed by the secondary rules of general international law. However, these general rules leave room for special rules in accordance with the *lex specialis* principle.[73] Even though it is not a self-contained regime,[74] space law contains several special rules. The most important of these from the perspective of self-defence is perhaps the rule that States bear international responsibility for "national activities" in outer space carried out by governmental agencies or by non-governmental entities, and for assuring that these national activities are carried out in conformity with the relevant treaty provisions. Space activities conducted by non-governmental entities require the authorisation and continuing supervision of the "appropriate State".[75] Hence, the responsibility of States in space law automatically extends to "national activities" conducted by non-governmental entities. This remarkably strict rule of attribution is a *lex specialis* compared to general international law, and somewhat mitigates the

[72] Tronchetti 2014: 117.

[73] Responsibility of States for Internationally Wrongful Acts, Article 55.

[74] Hobe 2019: 51–56.

[75] Outer Space Treaty, Article VI. See also, GA Res. 1962 (XVIII), 18 UN GAOR Suppl. No. 15 (A/5515), 15.

problems related to self-defence against non-state actors: an armed attack by a non-state actor constituting a "national activity" in outer space is automatically attributable to the "appropriate State". Different views have emerged as to what constitutes a "national activity": the term can be interpreted, for example, as an activity carried out by organs or nationals of a State, as an activity carried out as a launching State, or as an activity carried out under the territorial, personal or registration-based jurisdiction of a State.[76] The provisions under deliberation only apply to space activities, i.e. acts within the scope of space law. If an armed attack is carried out by means and methods not within the scope of space law, the rules of general international law will guide the determination of whether the qualitative element prevails. It should be added that the rules of international liability for damage caused by space objects, that is, the Outer Space Treaty, the Liability Convention, the customary rules of space law and the rules and principles of general international law also apply in the context of self-defence in outer space. Both damage caused by space objects belonging to the perpetrator and that of the victim of an armed attack need to be assessed, as appropriate, keeping in mind, *inter alia,* that no exoneration can be granted in cases of damage caused by activities not in conformity with international law, and that self-defence constitutes a circumstance precluding wrongfulness.[77]

Notwithstanding that circumstantial evidence may be sufficient, the identification of the perpetrator and the establishment of an armed attack involving outer space may also raise difficulties. The success of identification and proof will depend on the means, methods and duration of the attack, and on the space domain awareness capabilities of the attacked State. Kinetic or non-kinetic physical attacks are generally easier to detect than electronic attacks or cyberattacks.[78] Few players are capable of continuously detecting,

[76] Cheng 1998: 20–29; von der Dunk 2011: 9–18; Gerhard 2017: 383–405.

[77] Outer Space Treaty, Article VII; Convention on International Liability for Damage Caused by Space Objects, London, Moscow, Washington, 29 March 1972, 961 UNTS 187, Articles II–VI; Responsibility of States for Internationally Wrongful Acts, Article 21. See also, Jakhu–Freeland 2022: 16–17.

[78] Bingen et al. 2023: 6–7.

tracking, characterising and understanding events in outer space, which is essential to successfully identify and prove the occurrence of such an attack. If a State has such capabilities or has access to the information they provide, the perpetrator of a physical attack from the Earth is most likely to be identified. (Exceptions are, of course, conceivable.) This may not be the case for a physical attack from outer space. The perpetrator of an attack launched from Earth orbit is also likely to be identified, although unregistered space objects and/or military satellites hidden amongst space debris can make that task extremely difficult. However, the farther away the events take place from the Earth, the more the likelihood of successful identification and proof decreases. It is no coincidence that the States concerned are making serious efforts to develop their space domain awareness capabilities, particularly in the critical cislunar region, partly in an effort to prevent a "Space Pearl Harbor".[79]

The necessity, proportionality and termination of self-defence should be assessed in the "traditional" way. Having said that, the requirement of proportionality seems to be an exception: in the space environment, it arguably allows less leeway for measures taken in the exercise of the right of self-defence. For example, the proportionality of self-defence would appear to be seriously undermined by any measure that might generate a large amount of space debris. Nevertheless, the EU's Draft International Code of Conduct for Outer Space Activities would exceptionally but explicitly permit the direct or indirect destruction or damaging of space objects in self-defence.[80] Similarly, the use of nuclear weapons in outer space, which could irreparably and indiscriminately damage or disable any unshielded electronic system over a vast geographical area, would violate the proportionality of self-defence. Dual-use space objects further complicate the assessment of the legality of self- defence.[81] Since the proportionality of self-defence and respect for the law of armed conflicts are closely intertwined, the use of such means and methods of warfare may

[79] Report of the Commission to Assess United States National Security Space Management and Organization, 11 January 2001, viii, xiii, 22.

[80] Draft International Code of Conduct for Outer Space Activities, para. 4.2.

[81] Tronchetti 2014: 119.

lead to the disproportionality not only of specific military actions, but also of self-defence as a whole. Remarkably, selected rules and principles of space law, such as the rules on the treatment of astronauts and of space objects, seem to further restrict the freedom of action of parties to an armed conflict involving outer space. It should not be forgotten that an armed conflict would not *ipso facto* terminate or suspend the core treaties of space law, and that some of their relevant provisions also have a customary character.[82] The law of armed conflicts and space law would have to be interpreted and applied together.

CONCLUSIONS

The right of individual or collective self-defence can be exercised in outer space. However, generally acceptable observations seem to end at this point. Not surprisingly, serious theoretical and practical challenges arise relating to all the specific issues lying at the intersection between the use of outer space and self-defence. Difficult and complex questions have to be answered concerning, *inter alia,* the place where self-defence is exercised, the quantitative element of armed attack, the qualitative element of armed attack, the proof of armed attack occurring and the proportionality of measures taken in self-defence. The prevailing unfavourable international environment, the intensification of the new space race and the need to ensure the security of space objects are likely to bring these scarcely examined issues related to the right of self-defence in outer space to the fore. Recently, and for the first time, measures have been taken in self-defence in outer space, as was mentioned in the introduction. The safe and sustainable use of outer space has not been affected by this particular interception, which is believed to have occurred below the lowest stable orbits. However, the consequences of a large-scale space war would be felt by the entire

[82] Draft Articles on the Effects of Armed Conflicts on Treaties, Articles 7, 10 and Annex. In Yearbook of the International Law Commission, 2011, Vol. II. Part 2, U.N. Doc. A/CN.4/SER.A/2011/Add.1 (Part 2), 106.

human civilisation, and this unsettling prospect lends particular weight to the unanswered questions relating to self-defence in outer space. Scholars of international law and space law should play a prominent and proactive role in the search for answers.

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