ROMANIAN
JOURNAL OF INTERNATIONAL LAW

ISSN 2559 – 3846

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- Part II -

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RJIL No. 24/2020

Pages 54-107

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Andreea ZALOMIR*

Abstract**:** *As demonstrated in the first part of the present article,[1] the outer space is facing an increased militarization. Space-faring nations are competing in this novel environment to assert supremacy and, thus, secure advantages on Earth. As a result, the prospects of an incoming outer space conflict are higher with each technological advancement and launch. Not only governmental agencies, but also private actors are increasingly active in this spatial endeavour.*

According to the Outer Space Treaty, state parties should conduct their activities in outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations.[2] The beginning and conduct of warfare are strictly regulated by international legal norms and, thus, a potential conflict unfolding in outer space must also abide by these rules.

The purpose of the present paper is to analyze the jus ad bellum and jus in bello norms and interpret them in light of the specificities posed by a potential outer space warfare. The article takes into consideration the distinct weapons, actors and effects of such a conflict and will attempt to adapt the existing rules to this novel state confrontation environment.

Key-words: *use of force; self-defence; combatant; armed attack; legitimate military objective*

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[1] The first part of the article can be found here < http://rrdi.ro/no-23-january-june-2020/>.

[2] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, United Nations General Assembly Resolution 2222(XXI), 1966 *(The Outer Space Treaty),* Art. III.

1. Introduction

The so-called ”Space Age” opened up in a time when the international community was divided into two competing ideological spheres, namely the free, democratic world, led by the United States of America, and the communist states with the USSR at the forefront.[1] The USSR's successful launch of the first man-made object into outer space, in 1957, on a background of persistent nuclear threats, emphasized the military opportunities and challenges this new environment might present.[2] The space race between the two Cold War powers brought significant technological and scientific developments, benefiting the entire mankind, from weather to telecommunications and navigation satellites. Nevertheless, over the five decades of ideological conflict, the military component was persistently present in all space endeavours.[3]

Presently, despite the international space law prescribing for international cooperation in matters pertaining to outer space and the apparent harmonious collaboration of different space-faring nations as illustrated, for instance, by the International Space Station, the prospect of a conflict originating or being conducted in space has not dimmed.[4] On the contrary, the policies and behaviour of space-faring states contour a confrontational future for outer space, as demonstrated in the first part of the present article.[5] Either to exercise deterrence, to assume an aggressive posture or both, the United

[1] Cheng, Bin, *Studies in International Space Law*, Clarendon Press Oxford, 1997, p. 70; European Space Agency, ”Sputnik – 60 years of the space age”, <https://www.esa.int/About_Us/ESA_history/Sputnik_60_years_of_the_space_age >, last visited on 15/06/2020; National Aeronautics and Space Administration (NASA), “Sputnik and the Origins of the Space Age”, < https://history.nasa.gov/sputnik/sputorig.html >, last visited on 05/05/2020.

[2] Robert Preston, Dana Johnson, Sean Edwards, Michael Miller, Calvin Shipbaugh, *Space Weapons Earth Wars,* Project Air Force, RAND, 2002, p. 9; Isabella Diederiks-Verschoor, Vladimir Kopal, *An Introduction to Space Law,* Kluwer Law International, 2008, p. 2; Alan Steinberg, ”Weapons in Space: The Need to Protect Space Assets”, *Astropolitics: The International Journal of Space Politics and Policy*, 10:3, 26 November 2012, pp. 248 – 267, p. 250.

[3] Robert Preston, Dana Johnson, Sean Edwards, Michael Miller, Calvin Shipbaugh, *Space Weapons Earth Wars,* Project Air Force, RAND, 2002, p. 9; John Pike, “The military uses of outer space”, *SIPRI Yearbook: Armaments, Disarmament and International Security*, 2002, pp. 613 – 664, p. 613; Francisc Lyall, Paul Larsen, *Space Law. A Treatise,* Second Edition, Ashgate, 2009, p. 507; Alan Steinberg, ”Weapons in Space: The Need to Protect Space Assets”, *Astropolitics: The International Journal of Space Politics and Policy*, 10:3, 26 November 2012, pp. 248 – 267, p. 250; Frans Von der Dunk, “International space law*”,* in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 29-126, p. 44;

[4] Isabella Diederiks-Verschoor, Vladimir Kopal, *An Introduction to Space Law,* Kluwer Law International, 2008, pp. 95 – 96; Frans Von der Dunk, “International space law*”,* in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 29-126, pp. 113-115.

[5] First part of the article can be found here < http://rrdi.ro/no-23-january-june-2020/>;

States, Russia, China and their allies seem to have re-opened the race for space, now with much more financial and technological resources than fifty years ago. Moreover, the private corporations are assuming an active stance in this competition, proof being the recent successful collaboration between NASA and SpaceX to launch a manned flight to the International Space Station.[1] This is the first time in nine years when NASA astronauts launch from American soil, thus ending US's dependency on Russia for space launches.[2]

Consequently, the question is what does this mean in terms of legal implications? Is the current current space law framework, read in conjunction with the existing norms of public international law, appropriate to cover warfare in outer space? This second part of the article will attempt to analyse the rules regulating the initiation and conduct of warfare, as well as interpret and adapt them to the particular characteristics of a conflict unfolding in space. In the following paragraphs, the paper will approach issues such as the characterization of a military space operation as an "armed attack", the *Caroline* criteria triggering the right to self-defence and the legality of an anticipatory or pre-emptive action in self-defence, as well as the definition of combatant in the context of outer space warfare and other aspects pertaining to the conduct of hostilities in this novel environment.

2. The Jus ad Bellum Regime in Outer Space Warfare

"We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our lifetime has brought untold sorrow to mankind (...)"[3]

This is how the Charter of the United Nations debuts, foreshadowing the main goal of the organization. In accordance with article 1(1) of the Charter, the first purpose of the United Nations is the maintenance of international peace and security and, subsequently, the adoption of any collective measures aimed at preventing any threats to peace and suppressing any acts of aggression.[4] The consequence of the above mentioned article is that the use of force is

[1] NASA, "NASA Astronauts Launch from America in Historic Test Flight of SpaceX Crew Dragon", 30 May 2020, < https://www.nasa.gov/press-release/nasa-astronauts-launch-from-america-in-historic-test-flight-of-spacex-crew-dragon >, last visited on 16/05/2020.

[2] NASA, "NASA Astronauts Launch from America in Historic Test Flight of SpaceX Crew Dragon", 30 May 2020, < https://www.nasa.gov/press-release/nasa-astronauts-launch-from-america-in-historic-test-flight-of-spacex-crew-dragon >, last visited on 16/05/2020.

[3] United Nations, *Charter of the United Nations*, 1945, 1 UNTS XVI, Preamble.

[4] United Nations, *Charter of the United Nations*, 1945, 1 UNTS XVI, Art. 1(1).

prohibited, as per Article 2(4) of the Charter,[1] which outlaws any threat or use of force perpetrated by a state against "the territorial integrity or political independence" of another state.[2] Throughout its jurisprudence, the ICJ held that Article 2(4) is the pillar on which the entire Charter regime rests, as well as the codification of a rule of customary international law.[3]

One drawback of the rule on the prohibition of the use of force enshrined in the Charter stems from the lack of a precise definition as to what "force" entails. Therefore, recourse must be had to the interpretative methods provided by the Vienna Convention on the Law of Treaties (VCLT).[4] According to Article 31, apart from the textual interpretation, the meaning of a certain term included in a treaty can also be derived from the object and purpose of the agreement, including its context.[5] Moreover, the *travaux preparatoires* are one of the elements that can be taken into consideration when interpreting a treaty.[6] The Preamble of the Charter mentions among the purposes of the UN the maintenance of international peace and security and ensuring that "armed forces shall not be used, save in the common interest".[7] Article 39 allows the Security Council to take measures under Chapter VII only in situations of "a threat to the peace, breach of the peace, or act of aggression".[8] Other provisions of the UN Charter also suggest a clear distinction between measures involving the use of force and those falling short of it. For instance, Article 41 prescribes that the UN Security Council has the power to take "measures not involving the use of armed force" which "may include complete or partial interruption of economic relations", while Article 51 prescribes that the occurrence of an "armed attack" is a prerequisite for a state's right to self-defence.[9] Additionally, the documents drafted in the

[1] United Nations, *Charter of the United Nations*, 1945, 1 UNTS XVI, Art. 2(4).

[2] United Nations, *Charter of the United Nations*, 1945, 1 UNTS XVI, Art. 2(4).

[3] Case Concerning Armed Activities on the Territory of Congo *(Democratic Republic of Congo v. Uganda*), Judgement, ICJ Reports 2005, p. 168, para. 148; Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14*,* para. 190; Andrew Garwood-Gowers, "Pre-Emptive Self-Defence: A Necessary Development or the Road to International Anarchy", *23 Aust YBIL 51* 2004, p. 53; Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 86; Nicholas Tsagourias, "Non-state actors in international peace and security. Non-state actors and the use of force", in ed. by Jean d'Aspermont, *Participants in the International Legal System. Multiple Perspectives on non-state actors in international law,* Routledge Research in International Law, 2011, p. 326.

[4] United Nations, *Vienna Convention on the Law of Treaties*, 23 May 1969, UNTS vol. 1155, p. 331, Art. 31.

[5] United Nations, *Vienna Convention on the Law of Treaties*, 23 May 1969, UNTS vol. 1155, p. 331, Art. 31.

[6] United Nations, *Vienna Convention on the Law of Treaties*, 23 May 1969, UNTS vol. 1155, p. 331, Art. 32.

[7] United Nations, *Charter of the United Nations*, 1945, 1 UNTS XVI, Preamble, Art. 1(1).

[8] United Nations, *Charter of the United Nations*, 1945, 1 UNTS XVI, Art. 39.

[9] United Nations, *Charter of the United Nations*, 1945, 1 UNTS XVI, Arts. 41, 51.

process of concluding the UN Charter reveal that a proposal lodged by the delegation of Brazil to cover economic coercion within the scope of Article 2(4) has been rejected, with 26 votes against and only 2 in favour.[1] Therefore, extending the scope of Article 2(4) to economic coercion would go against the object and purpose of the treaty and, also, would be in contradiction with the intention of the drafters.

In conclusion, the term "force" shall cover only aggressive actions of a military nature. The ICJ concurred with this idea when it concluded that the US's arming and training of the *contras* in Nicaragua amounted to an illegal use of force, while mere funding did not.[2] Additionally, a significant number of scholars expressed their support for this approach.[3] As such, actions such as denying a country's access to satellite data obtained from foreign sources, used as a tool for economic coercion, would not fall under the scope of the prohibition on the use of force. At most, it can be a violation of the principles of international cooperation, freedom of access and exploration and the right to benefit from such endeavours enshrined in the Outer Space Treaty.[4]

The first use of space for purely military purposes was during the operation Desert Storm (1990 – 1991).[5] Systems based in outer space provided navigational, weather-related, missile defence, surveillance and reconnaissance, communications and target support to land forces.[6]

More than 1 800 active satellites were orbiting the Earth in 2018, while nine countries and one international organization have the capabilities for

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[1] San Francisco Conference Documents (1945), Docs. 527, 559; Albrecht Randelzhofer, "Article 2(4)", in ed. by Bruno Simma et al., *The Charter of the United Nations: A Commentary,* Vol. 1.1, Oxford University Press, 2002, p. 112; Lee Buchheit, "The Use of Nonviolent Coercion: A Study in Legality under Article 2(4) of the Charter of the United Nations", *University of Pennsylvania Law Review*, vol. 122, no. 4, 1974, pp. 983 – 1011.

[2] Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14, para. 228.

[3] Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 88; James Crawford, *Brownlie's Principles of Public International Law,* 8th Edition, Oxford University Press, 2012, p. 747; Albrecht Randelzhofer – "Article 2(4)", in ed. by Bruno Simma et al., *The Charter of the United Nations: A Commentary",* Vol. 1.1, Oxford University Press, 2002, pp. 112, 124; Malcolm Shaw, *International Law,* 7th Edition, Cambridge University Press, 2014, pp. 815 – 816.

[4] United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (The Outer Space Treaty),* United Nations General Assembly Resolution 2222(XXI), 1966, Arts. I, III, X, XI, XII.

[5] Ricky Kelly, Major, USAF, *Centralized Control of Space. The Use of Space Forces by a Joint Force Commander,* Air University Press, Maxwell Air Force Base, Alabama, 28 June 1993, p. 1; Jeffrey Caton, *Joint Warfare and Military Dependence on Space,* National Defense Univ Washington DC Inst for National Strategic Studies, 1996.

[6] Ricky Kelly, Major, USAF, *Centralized Control of Space. The Use of Space Forces by a Joint Force Commander,* Air University Press, Maxwell Air Force Base, Alabama, 28 June 1993, p. 1; Jeffrey Caton, *Joint Warfare and Military Dependence on Space,* National Defense Univ Washington DC Inst for National Strategic Studies, 1996.

independent launching.[1] As outer space becomes more crowded, tensions rise among the states, which, in turn, leads to the weaponization of space.

In May 2019, Russian President Vladimir Putin stated that the "preservation of strategic stability and military parity" depends on Russia's capability to "effectively resolve security tasks in outer space" and to acquire "military and dual-purpose spacecraft".[2] The United States' answer was the establishment of the independent Space Force, a military structure tasked with organizing, training and equipping space forces.[3] France followed the same direction when President Emmanuel Macron announced his country would begin to develop an anti-satellite laser weapon and armed satellites.[4]

These declarations are substantiated by the actual behaviour of states and the actions undertaken. According to a 2019 report prepared by the United States Defence Intelligence Agency, states are developing more and more space weapons, with increasing degrees of technical capabilities.[5] Apart from jamming systems intended to disrupt the functioning of satellites, both Russia and China own anti-satellite (ASAT) systems capable of disrupting, degrading or completely damaging adversaries' satellites.[6] Russia's Aerospace Forces received a laser weapon system with the potential of being used for ASAT missions.[7] President Putin characterized it as a "new type of strategic weapon", whereas the Russian Defence Ministry underlined its capability of "fighting satellites in orbit".[8] The Chinese People's Liberation Army (PLA) owns a ground-based ASAT missile, capable of targeting

[1] Ricky Kelly, Major, USAF, *Centralized Control of Space. The Use of Space Forces by a Joint Force Commander,* Air University Press, Maxwell Air Force Base, Alabama, 28 June 1993, p. 1; Jeffrey Caton, *Joint Warfare and Military Dependence on Space,* National Defense Univ Washington DC Inst for National Strategic Studies, 1996; Currently, China, India, Iran, Israel, Japan, Russia, North Korea, South Korea, the United States and the European Space Agency have the capabilities for independent spacecraft launching.

[2]Kremlin Press Centre, "Meeting with Defence Ministry leadership and defence industry heads*",* 16 May 2019, < http://en.kremlin.ru/events/president/news/60538 >, last visited on 23/05/2020; Michael Peel, Christian Shepherd, Aime Williams, "Vulnerable satellites: the emerging arms race in space*",* 13 November 2019, Financial Times, < https://www.ft.com/content/a4300b42-f3fe-11e9-a79c-bc9acae3b654 >, last visited on 23/05/2020.

[3] United States Space Force, "About US Space Force", < https://www.spaceforce.mil/About-Us/About-Space-Force >, last visited on 23/05/2020.

[4] Taylor Dinerman, "Space weapons are proliferating fast: should we accept it"*, The Space Review,* 4 November 2019, < https://www.thespacereview.com/article/3824/1 >, last visited on 25/05/2020.

[5] United States Defence Intelligence Agency, *Challenges to Security in Space,* January 2019, p. 7.

[6] United States Defence Intelligence Agency, *Challenges to Security in Space,* January 2019, pp. 21, 29.

[7] United States Defence Intelligence Agency, *Challenges to Security in Space,* January 2019, p. 29.

[8] Tom O'Connor, "Russia's Military Has Laser Weapons That Can Take Out Enemies In Less Than A Second", *Newsweek*, 12 March 2018, < https://www.newsweek.com/russia-military-laser-weapons-take-out-enemies-less-second- 841091 >, last visited on 25/05/2020; United States Defence Intelligence Agency, *Challenges to Security in Space,* January 2019, p. 29.

satellites stationed in the low-earth orbit.[1] Both Iran and North Korea, through their developments in the field of intercontinental ballistic missiles (ICBM) technologies, have the potential of developing similar ground-based ASAT systems.[2] In terms of orbital threats, Russia, China and the United States continue to research and develop dual-use capabilities.[3]

Satellites presumably intended for inspection and service could have the capacity to transform into a weapon and damage or destroy another country's satellite by approaching it on orbit.[4] For instance, in 2017, Russia launched one such satellite, which reportedly displayed a behaviour inconsistent "with on-orbit inspection activities or space situational awareness capabilities".[5] Reportedly, Russia runs a co-orbital ASAT system program since 2011 under the code name "Burevestnik".[6] Japan announced its intention to develop its own ASAT capabilities during this decade.[7] China, India, the United States and Russia also conducted tests of their ASAT systems, the first two successfully managing in deliberately destroying two of their own satellites that were out of function.[8]

In conclusion, there is a trend towards the weaponization of outer space, which does not breach the Outer Space Treaty since it only prohibits the placement of nuclear weapons or weapons of mass destruction.[9] However, the Outer Space Treaty provides that states must act in outer space in

[1] United States Defence Intelligence Agency, *Challenges to Security in Space,* January 2019, p. 29, p. 21.

[2] United States Defence Intelligence Agency, *Challenges to Security in Space,* January 2019, p. 29, pp. 31-32.

[3] United States Defence Intelligence Agency, *Challenges to Security in Space,* January 2019, pp. 22, 29.

[4] United States Defence Intelligence Agency, *Challenges to Security in Space,* January 2019, pp. 22, 29.

[5] United States Defence Intelligence Agency, *Challenges to Security in Space,* January 2019, pp. 22, 29.

[6] Theresa Hitchens, "Russia Builds New Co-Orbital Satellite: SWF, CSIS Say", *Breaking Defense*, 4 April 2019, < https://breakingdefense.com/2019/04/russia-builds-new-co-orbital-satellite-swf-csis-say/ >, last visited on 25/05/2020.

[7] Taylor Dinerman, "Space weapons are proliferating fast: should we accept it", *The Space Review*, 4 November 2019, < https://www.thespacereview.com/article/3824/1 >, last visited on 25/05/2020.

[8] Phil Stewart, "US Studying India anti-satellite weapons test, warns of space debris", *Reuters*, 27 March, 2019, < https://www.reuters.com/article/us-india-satellite-usa/u-s-studying-india-anti-satellite-weapons-test-warns-of-space-debris-idUSKCN1R825Z >, last visited on 25/05/2020; United States Space Command Public Affairs, "Russia tests direct-ascent anti-satellite missile", 15 April 2020, <https://www.spaceforce.mil/News/Article/2151733/russia-tests-direct-ascent-anti-satellite-missile>, last visited on 25/05/2020.

[9] United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (The Outer Space Treaty),* United Nations General Assembly Resolution 2222(XXI), 1966, Art. IV.

accordance with international law, including the UN Charter.[1] As a result, the employment of any of the weapons described above against the space objects of another state would constitute a violation of Article 2(4) of the UN Charter. Consequently, it is necessary to establish the conditions for invoking Article 51 of the UN Charter following an attack directed at or in outer space. A lack of clarity as to the prerequisites for triggering the right to self-defence might lead to either an abuse of the Charter's provision or to an infringement of a state's right to take measures aimed at countering an aggressive act. The following sub-chapter will address the main elements necessary for a state's right to self-defence and their interpretation in the context of outer space warfare.

2.1 The Right to Self-Defence

The right to self-defence and the conditions necessary for invoking it are part of customary international law and their expression is to be found in the exchange of letters between the British authorities and the US Secretary of State following the 1837 *Caroline* incident.[2] The ICJ acknowledged this customary nature in its jurisprudence.[3] Article 51 of the UN Charter crystallizes this right, as the Member States' lawful entitlement to use force in self-defence if they are victims of an "armed attack", one of the exceptions to the absolute prohibition on the use of force.[4] This inclusion of the right to self-defence in an international agreement does not mean that it ceased to exist under customary international law. In the *Nicaragua Case* judgment, the

[1] United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (The Outer Space Treaty),* United Nations General Assembly Resolution 2222(XXI), 1966, Art. III.

[2] The *Caroline* incident of 1837 took place during the Mackenzie Rebellion against the British governing in Upper Canada. The American population along the border sympathized with the rebels and supplied them with materials and men using the steamboat Caroline. The British retaliated by setting the vessel on fire and, thus, killing or injuring several American citizens. United Kingdom claimed the act was done in self-defence, while the Americans denounced it as a breach of sovereignty. Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 185; Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 44; Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 148; Donald Rothwell, "Anticipatory Self-Defence in the Age of International Terrorism", 24 *U. Queensland L.J.* 337, 2005, p. 339; Malcolm Shaw, *International Law,* 7th Edition, Cambridge University Press, 2014, p. 820; Jan Klabbers, *International Law,* Cambridge University Press, 2013, p. 193.

[3] International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14*,* para. 94; International Court of Justice*,* Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*,* Adv. Opinion, ICJ Reports 2004, p. 136 *,* para. 87; Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 181.

[4] United Nations, *Charter of the United Nations*, 1945, 1 UNTS XVI, Arts. 2(4), 51.

ICJ concluded that "it cannot (…) be held that Article 51 is a provision which 'subsumes and supervenes' customary international law (…) customary international law continues to exist alongside treaty law".[1] Regardless whether a custom and treaty provision are identical or not, they continue to be equally applicable.[2] Consequently, the right to self-defence falls under the scope of both customary law and Article 51 of the UN Charter.

The customary rule of self-defence and the treaty provision regulate areas that "do not overlap exactly", therefore the present sub-chapter will analyse and interpret the criteria enshrined in both sources.[3] The first element to be discussed is the requirement of "armed attack" and whether outer space aggressive acts fall within its scope.

2.1.1 "Military space operations" as an "armed attack"

Article 51 of the UN Charter, read in conjunction with Article 2(4), prescribes as the first prerequisite for triggering the right to self-defence the existence of an armed attack perpetrated by a state against the territorial integrity or political independence of another state.[4] However, both provisions are silent as to the nature of the "armed attack" and its interpretation rests in the ICJ jurisprudence.

In determining the scope of the concept of "armed attack", the ICJ firstly relied on the UN GA Resolution on the Definition of Aggression.[5] Article 1 of the document outlines a definition for the acts of aggression in line with Article 2(4) of the UN Charter.[6] The difference rests in the fact that the former does not include "threats" as falling within the scope of an act of aggression.[7]

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[1] International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14, para. 176.

[2] International Court of Justice, North Sea Continental Shelf Cases *(Federal Republic of Germany/Denmark; Federal Republic of Germany/Netherlands),* Judgment, ICJ Reports 1969, p. 3*,* para. 63; International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14*,* paras. 176 – 177.

[3] International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14*,* para. 176.

[4] United Nations, *Charter of the United Nations*, 1945, 1 UNTS XVI, Arts. 2(4), 51.

[5] International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14*,* para. 195; International Court of Justice*,* Case Concerning Oil Platforms *(Islamic Republic of Iran v. USA),* Judgment, ICJ Reports 2003, p. 161*,* para. 53; International Court of Justice, Case Concerning Armed Activities on the Territory of Congo *(Democratic Republic of Congo v. Uganda),* Judgement, ICJ Reports 2005, p. 168*,* para. 146.

[6] United Nations, *United Nations General Assembly Resolution 3314 (XXIX) on the Definition of Aggression*, 14 December 1974, Art. 1.

[7] United Nations, *United Nations General Assembly Resolution 3314 (XXIX) on the Definition of Aggression*, 14 December 1974, Art. 2.

Article 3 of the resolution lists invasion or attack, military occupation, bombardment, blockade of ports or coasts, attacks on land, sea, or air forces among acts characterized as aggressive.[1] A state allowing another state to use its territory for the perpetration of an attack against a third state or the sending by or on behalf of a state of irregular forces with the purpose of carrying out an armed attack against another state are also examples of aggression, as defined by the UN General Assembly Resolution.[2] Therefore, the level of gravity inferred from the definition of the acts of aggression constituted the basis for ICJ's similar threshold established for "armed attacks".[3]

In regards to the scale that the armed attack must reach, the ICJ in the case concerning *Military and Paramilitary Activities in and against Nicaragua* held that, in order to invoke the right to self-defence, the attack must go beyond a "mere frontier incident".[4] Through this finding, the Court established a gravity threshold by stating that the right to self-defence can be triggered only by "the most grave forms of the use of force" as opposed to "lesser grave forms".[5] The ICJ reiterated the so-called *"Nicaragua gap"* in the *Oil Platforms* judgment.[6] Judge Simma opposed the Court's findings in his Separate Opinion to the aforementioned judgment. He implied that States should have the right to take strictly defensive military action even against attacks that fall below the gravity threshold.[7] Yoram Dinstein also criticized the Court for including all frontier incidents in the "lesser uses of force" category.[8] In his opinion, every attack that results in serious consequences must qualify as an "armed attack" within the meaning of Article 51.[9] Presently, it is generally accepted that an "armed attack" also constitutes an

[1] United Nations, *United Nations General Assembly Resolution 3314 (XXIX) on the Definition of Aggression*, 14 December 1974, Art. 3(a) – (d);

[2] United Nations, *United Nations General Assembly Resolution 3314 (XXIX) on the Definition of Aggression*, 14 December 1974, Art. 3(e) – (g);

[3] Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 178.

[4] International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14*,* para. 195.

[5] International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14*,* para. 191.

[6] International Court of Justice, Case Concerning Oil Platforms *(Islamic Republic of Iran v. USA),* Judgment, ICJ Reports 2003, p. 161*,* paras. 51, 62; Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 147; Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 89.

[7] Separate Opinion of Judge Simma to *Case Concerning Oil Platforms* (Islamic Republic of Iran v. USA), Judgment, ICJ Reports 2003, p. 290.

[8] Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 195.

[9] Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 195.

act of aggression.[1] The gravity threshold established by the ICJ is applicable and will be used for the purposes of this paper. This approach is necessary in order to prevent abuses of Article 51 of the UN Charter.

In the context of outer space warfare, allowing a state to respond in self-defence for a temporary disruption in the functioning of a satellite, which did not have serious consequences, would potentially mandate a disproportionate response. As a result, a state should be allowed to act in self-defence following an aggressive act in outer space only if it is the victim of an attack qualifying as a *"most grave form of the use of force"*.

In cases of actions falling below the threshold, many states invoked the right to self-defence as a response to an "accumulation of events".[2] This approach entails that incidents qualifying as "lesser uses of force" reach the necessary threshold to trigger self-defence if taken together.[3] The ICJ seemed to allow in its jurisprudence the applicability of this theory, despite not specifically confirming it.[4] International Law Commission (ILC) Special Rapporteur, Professor Roberto Ago declared himself in favour of self-defence taken in response to an accumulation of events as long as it complies with the requirement of proportionality.[5] Nevertheless, practice does not lead to the conclusion that the accumulation of events theory is generally accepted. As such, it is important to note that Israel has used it in order to justify its operations in Jordan, Egypt and Syria during the Arab-Israeli conflicts. Further, the United Kingdom also used the accumulation of events theory in 1964, for the operation targeting Harib Fort in Yemen.[6] However, the

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[1] Nico Krisch, "Article 39", in Bruno Simma et al., *The Charter of the United Nations: A Commentary,* 3rd Edition, Oxford University Press, 2013, p. 1293.

[2] Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 155; Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 89.

[3] Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 155; Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 89.

[4] International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14, para. 231; International Court of Justice, Case Concerning the Land and Maritime Boundary between Cameroon and Nigeria *(Cameroon v. Nigeria: Equatorial Guinea intervening*), Judgement, ICJ Reports 2002, p. 303, para. 323; International Court of Justice, Case Concerning Oil Platforms *(Islamic Republic of Iran v. USA),* Judgment, ICJ Reports 2003, p. 161, para. 64; International Court of Justice, Case Concerning Armed Activities on the Territory of Congo *(Democratic Republic of Congo v. Uganda),* Judgement, ICJ Reports 2005, p. 168, para. 146.

[5] Robert Ago, "The internationally wrongful act of the State, source of international responsibility (part 1)", Addendum to the *8th Report on State Responsibility by the Special Rapporteur*, 32nd Session of the ILC (1980), UN Doc. A/CN.4/318/Add.5 – 7, *Yearbook of the International Law Commission*, 1980, Vol. II (1) para. 121.

[6] Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 51.

Security Council has criticized these acts, and labelled them as being disproportionate and, thus, unlawful.[1] Even if the applicability of the "accumulation of events" theory is controversial, the ICJ did not dismiss it decisively. Perhaps the Court has undertaken this approach because the theory provides a solution to the so-called *Nicaragua gap*, by allowing victim states to take defensive action even against acts falling below the threshold established by the Court. Nevertheless, caution must be paid to avoid any abuse of Article 51 of the UN Charter. The cumulated events should reach a level of gravity that justifies their collective characterization as a "most grave form of the use of force". As such, the standard determined by the Court in the Nicaragua case should not necessarily be limited at one grave incident, but could also be reached through a series of incidents, of a "lesser" gravity.

Nevertheless, the use of force in the outer space might imply certain relevant distinctions. Commentators have concluded that the intentional destruction of a country's satellite by another country, either through ASAT systems or through on-orbit weaponized satellites would amount to an "armed attack" and, thus, would authorize an action in self-defence.[2] The first argument supporting this statement stems from an analogy between outer space and the international law of the sea, which provides that an attack against a ship in the high seas shall qualify as an attack against the territory of the flag state.[3] The ICJ upheld this position in the *Oil Platforms* judgment.[4] Moreover, the Court did not dismiss the possibility that *"the mining of a single military vessel might be sufficient to bring into play the 'inherent right of self-defence'".*[5] Consequently, an intentional, destructive attack against a military

[1] Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 51.

[2] Fabio Tronchetti, "Legal aspects of the military uses of outer space", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 331 -381, p. 355.

[3] Alan Vaughan Lowe, *"*Self-Defence at Sea*",* in ed. by William Eliott Butler, *The Non-Use of Force in International Law,* Martinus Nijhoff, 1989, pp. 185, 188; Efthymios Papastavridis, *The Interception of Vessels on the High Seas. Contemporary Challenges to the Legal Order of the Oceans,* Bloomsbury Publishing, 2014, pp. 151 – 152; Fabio Tronchetti, "Legal aspects of the military uses of outer space", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, p. 355.

[4] International Court of Justice, Case Concerning Oil Platforms *(Islamic Republic of Iran v. USA),* Judgment, ICJ Reports 2003, p. 161, para. 64.

[5] International Court of Justice, Case Concerning Oil Platforms *(Islamic Republic of Iran v. USA),* Judgment, ICJ Reports 2003, p. 161, para. 72.

satellite is an "armed attack" as within the scope of Article 51 of the UN Charter and triggers the right to self-defence of the state of registry.[1]

The second argument supporting the characterization of an aggressive act against a satellite as an "armed attack" relies on one of its potential effects. Such an attack might increase the victim's vulnerability on Earth since militaries are now heavily relying on data provided by surveillance satellites and on communication facilitated by them.[2] The targeted state would be unable to obtain strategic military information concerning, for instance, missile attacks or coordinate its land, maritime or air forces, thus increasing the possibility of also becoming the victim of a traditional act of aggression. Consequently, an act of aggression against a satellite can be interpreted as an attack against the territorial integrity or political independence of the state of registry, thus falling within the scope of "armed attack". An attack against a satellite might seem a rather mild action in comparison with invasion, blockades or bombardment. Nevertheless, the intentional destruction of a state's satellite by another state bears a significant importance in the present context of technological development and reliance on space assets. Additionally, as was already mentioned in the article, the purpose is to interpret the existing rules of international law in the context of outer space warfare. This entails an adaptation to the specificities of this new environment, the types of weapons employed and the gravity scale of consequences, which might ensue from such an attack.

The first issue arising from this analysis refers to armed attacks against commercial satellites. In order to shed light on this problem, we will resort, once more, to the analogy with the international law of the sea and to the ICJ judgment in the *Oil Platforms Case.* The Court did not explicitly dismiss the idea that an attack against a commercial vessel might qualify as an "armed attack" within the scope of Article 51.[3] Moreover, the Court concluded that the various instances cited by the United States as giving rise to its right to self-defence against Iran fell below the threshold of "armed attack" solely on

[1] Fabio Tronchetti, "Legal aspects of the military uses of outer space", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, p. 355; Dale Stephens, "Increasing Militarization of Space and Normative Responses", in ed. by Venkata Rao, V. Gopalkrishnan, Kumar Abhijeet, *Recent Developments in Space Law: Opportunities and Challenges",* Springer, 2017, pp. 91-106, p. 97; Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 2016; Jackson Nyamuya Maogoto, Steven Freeland, "Space Weaponization and the United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?", *The International Lawyer*, Vol. 41, No. 4, Winter 2007, pp. 1091 – 1119, p. 1111.

[2] United States Defence Intelligence Agency, *Challenges to Security in Space,* January 2019, p. 7.

[3] Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 217; Geir Ulfstein, "How International Law Restricts the Use of Military Force in Hormuz", *Blog of the European Journal of International Law,* 27 August 2019, < https://www.ejiltalk.org/how-international-law-restricts-the-use-of-military-force-in-hormuz/ , last visited on 28/05/2020.

the basis of their gravity, not because the targets performed commercial activities.[1] However, an attack on a single commercial vessel might not suffice to trigger the right to self-defence, since the Court admitted this possibility only in cases of attacks perpetrated against *military* vessels and the UN GA Declaration on the Definition of Aggression limits its application to aggressive acts against "fleets".[2] Consequently, a state may invoke the right to self-defence as a response to attacks against commercial vessels flying its flag only if, taken cumulatively, they reach the necessary level of gravity as to be characterized as an instance of the "most grave form of use of force".[3] The same test should be applicable to attacks against commercial satellites. Multiple attacks of a state against the commercial satellites registered with another state, regardless whether the government or a private corporation launched them, might trigger the right to self-defence if they bear consequences of sufficient gravity. For instance, repeated aggressive acts against commercial communication satellites might impair the efficient functioning of the emergency services of a state, thus affecting its security interests.[4]

The same *"accumulation of events"* theory would be applicable to acts of jamming or cyber-attacks against a satellite. A single such instance would be insufficient to trigger the right to self-defence. However, multiple disruptive acts of grave consequences would mandate the state of registry to act under Article 51 of the UN Charter.

In conclusion, an attack performed by a state against a space object registered with another state can fall within the scope of an "armed attack" as prescribed by Article 51 of the UN Charter as long as it reached the necessary gravity threshold, either on its own or as an accumulation of events. The next step

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[1] International Court of Justice, Case Concerning Oil Platforms *(Islamic Republic of Iran v. USA),* Judgment, ICJ Reports 2003, p. 161, para. 64.

[2] International Court of Justice, Case Concerning Oil Platforms *(Islamic Republic of Iran v. USA),* Judgment, ICJ Reports 2003, p. 161, para. 72; United Nations, *United Nations General Assembly Resolution 3314 (XXIX) on the Definition of Aggression*, 14 December 1974, Art. 3(d); Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 217; Geir Ulfstein, "How International Law Restricts the Use of Military Force in Hormuz", *Blog of the European Journal of International Law,* 27 August 2019, < https://www.ejiltalk.org/how-international-law-restricts-the-use-of-military-force-in-hormuz/ , last visited on 28/05/2020.

[3] Geir Ulfstein, "How International Law Restricts the Use of Military Force in Hormuz", *Blog of the European Journal of International Law,* 27 August 2019, < https://www.ejiltalk.org/how-international-law-restricts-the-use-of-military-force-in-hormuz/ , last visited on 28/05/2020.

[4] The Organization for Economic Co-operation and Development, "Monitoring Global Threats: The Contribution of Satellite Technologies", 5 November 2012, <https://www.oecd.org/futures/space/OECD%20Space%20Forum%20Brochure%20-%20Global%20threats%20and%20satellites.pdf >, p. 3, last visited on 27/05/2020; Hearing before the Strategic Forces Subcommittee of the Committee on Armed Services House of Representatives, "Space and US National Power", 109th Congress, 2nd Session, 21 June 2006, p. 61.

part of the present article will deal with the rules of attributing responsibility to states for internationally wrongful acts and their reconciliation with the role of the private industry in space – related operations.

2.1.2 Responsibility of states for outer space "armed attacks". The private industry conundrum

Article 2(4) of the UN Charter prohibits the threat or use of force in the international relations established among member states of the UN, thus conferring a state-centred nature to this norm.[1] The ICJ discussed the right to self-defence in several cases and suggested that the legitimacy of an action in self-defence depends upon the attribution of the armed attack to a state, thus adopting a narrow interpretation of this right.[2] In the *Construction of a Wall Advisory Opinion,* the Court noted that Article 51 of the UN Charter recognizes *"the existence of an inherent right of self-defence in the case of armed attack by one State against another State".*[3] State involvement and attribution are also central in the judgments rendered in the *Nicaragua Case* and *Armed Activities Case.*[4]

The ILC Articles on Responsibility of States for Internationally Wrongful Acts provide the proper framework to assess whether an act is attributable to a state. A state is responsible for attacks committed by one of its organs, whatever function it exercises and whatever position it occupies.[5] The ILC, in its commentaries to the Draft Articles on Responsibility of States for Internationally Wrongful Acts, mentions that this rule has a broad scope and includes state organs at all levels, including regional and local.[6] Relevant

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[1] United Nations, *Charter of the United Nations*, 1945, 1 UNTS XVI, Art. 2(4).

[2] Malcolm N. Shaw, *International Law,* 7th Edition, Cambridge University Press, 2014, p. 823; Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 131.

[3] International Court of Justice, Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*,* Adv. Opinion, ICJ Reports 2004, p. 136*,* para. 139.

[4] International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14*,* para. 195; International Court of Justice*,* Case Concerning Armed Activities on the Territory of Congo *(Democratic Republic of Congo v. Uganda),* Judgement, ICJ Reports 2005, p. 168 *,* para. 147; Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, pp. 130, 202.

[5] International Law Commission, "Responsibility of States for Internationally Wrongful Acts"*,* 2001, *UN GA Resolution 56/83*, 12 December 2001, Art. 4.

[6] International Law Commission, "Draft Articles on Responsibility of States for Internationally Wrongful Acts with commentaries"*, Yearbook of the International Law Commission*, Vol. II, Part Two, 2001, Commentary (6) to Article 4.

issues concerning attribution and, thus, the legality of an action in self-defence arise if an entity not having the status of state organ perpetrates an attack against a state. However, the ILC Articles on State Responsibility cover such instances as well. Firstly, a state is responsible for acts committed by entities endowed with governmental authority by the law of that state, as long as the entity "is acting in that capacity in the particular instance".[1] Such entities include private corporations entitled to exercise governmental functions.[2] One such example is represented by private security firms contracted by the state to provide prison guards or perform arrests following a judicial sentence.[3] Article 7 of the ILC Articles on State Responsibility provides that the conduct of organs of the state or of entities exercising governmental authority is attributable to the state even if it comprises *ultra vires* acts or acts which contravene instructions.[4] However, the entity must act in its official capacity, the provision excluding purely private conduct from its scope.[5]

Secondly, even if an act is perpetrated by an entity not falling within the scope of Articles 4 and 5, it can still be attributable to a state as long as it is directed or controlled by that state.[6] Therefore, a "specific factual relationship" must exist between the private entity engaged in the conduct and the state.[7] The ICJ in the *Nicaragua Case* established a threshold for the level of control that triggers the state attribution necessary to act in self-defence. The Court held that for an armed attack to be attributable to a state and give rise to international responsibility, *"it would in principle have to be proved that that State had effective control of the military or paramilitary operations in the course of which the alleged violations were committed".*[8] Therefore, the

[1] International Law Commission, "Responsibility of States for Internationally Wrongful Acts", 2001, *UN GA Resolution 56/83*, 12 December 2001, Art. 5.

[2] International Law Commission, "Draft Articles on Responsibility of States for Internationally Wrongful Acts with commentaries", *Yearbook of the International Law Commission*, Vol. II, Part Two, 2001), Commentary (2) to Article 5.

[3] International Law Commission, "Draft Articles on Responsibility of States for Internationally Wrongful Acts with commentaries", *Yearbook of the International Law Commission*, Vol. II, Part Two, 2001, Commentary (2) to Article 5.

[4] International Law Commission, "Responsibility of States for Internationally Wrongful Acts", 2001, *UN GA Resolution 56/83*, 12 December 2001, Art. 7.

[5] International Law Commission, "Draft Articles on Responsibility of States for Internationally Wrongful Acts with commentaries", *Yearbook of the International Law Commission*, Vol. II, Part Two, 2001, Commentary (7) to Article 7.

[6] International Law Commission, "Responsibility of States for Internationally Wrongful Acts", 2001, *UN GA Resolution 56/83*, 12 December 2001, Art. 8.

[7] International Law Commission, "Draft Articles on Responsibility of States for Internationally Wrongful Acts with commentaries", *Yearbook of the International Law Commission*, Vol. II, Part Two, 2001, Commentary (1) to Article 8.

[8] Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14*,* para. 115.

involvement of the state must go beyond mere financing or provision of weapons and logistical support.[1] A victim state can invoke self-defence against another state for an act perpetrated by non-state actors only if they acted under the instructions and control of the latter.[2] The final instance when an act of a non-state actor is attributable to a state is when that state acknowledges and adopts the conduct as its own.[3] In this case there is an *ex-post* attribution through either conduct or words, which must be clear and unequivocal.[4]

This discussion on state attribution and the possibility to act in self-defence against attacks perpetrated by non-state actors bears a significant importance in the context of outer space warfare. Private corporations are no longer acting as mere contractors to states, but are becoming active players in space.[5] Companies such as SpaceX, Blue Origin, Virgin Galactic, Lockheed Martin in the United States and Arianespace, Airbus DS, Thales Alenia Space, Eutelsat in Europe launch and operate satellites, rockets and develop technologies for space shuttle missions.[6] According to Article VI of the OST, state parties are internationally responsible for national activities conducted in outer space, regardless whether governmental or non-governmental entities perform them.[7] Professor Bin Cheng links international responsibility of states for outer space activities with the concept of jurisdiction, thus concluding that states exercising jurisdiction over a space object and any personnel on board shall bear international responsibility for wrongful acts.[8] Article VIII of the OST provides that the state of registry retains jurisdiction

[1] International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14, para. 195.

[2] Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 221.

[3] International Law Commission, "Responsibility of States for Internationally Wrongful Acts", 2001, *UN GA Resolution 56/83*, 12 December 2001,Art. 11.

[4] International Law Commission, "Draft Articles on Responsibility of States for Internationally Wrongful Acts with commentaries", *Yearbook of the International Law Commission*, Vol. II, Part Two, 2001, Commentaries (1), (8) to Article 11.

[5] General Rapporteur Jean-Marie Bockel, "The Future of the Space Industry" General Report, Parliamentary Assembly, Economic and Security Committee, *173 ESC 18 E fin*, 17 November 2018, p. 2.

[6] General Rapporteur Jean-Marie Bockel, "The Future of the Space Industry" General Report, Parliamentary Assembly, Economic and Security Committee, *173 ESC 18 E fin*, 17 November 2018, p. 2, pp. 2-4

[7] United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (The Outer Space Treaty),* United Nations General Assembly Resolution 2222(XXI), 1966, Art. VI.

[8] Bin Cheng, *Studies in International Space Law,* Calrendon Press, Oxford, 1997, p. 639.

and control over launched objects and the personnel on board.[1] Consequently, the state of registry would incur responsibility for acts committed by governmental or non-governmental entities in outer space. However, attribution of an internationally wrongful act to a state requires a certain degree of involvement in its commission or, at least, adoption of the act as its own, as it has been discussed above. Considering these facts, the ILC Articles on State Responsibility remain the basis for establishing attribution of an armed attack in outer space.

It is undisputable that a victim state can act in self-defence if another state, through its official organs, destroys one or more of its satellites or as a response to an accumulation of events bearing consequences similar to an armed attack. However, if the attack originates from the launching facilities or from a space object owned by a private corporation, one must apply the rules of attribution.

First of all, if the private corporation is a contractor for a state, tasked with performing governmental activities such as launching or operating military satellites, any act of aggression it perpetrates will be attributed to the state in question. The lack of specific instructions to perpetrate the attack bears no consequence. Secondly, even if the private entity does not enjoy governmental functions, but acts on behalf or under the instructions of a state, that particular conduct is attributable to the state. There is a special situation arising from this rule in the context of outer space warfare. As the present article previously discussed, some corporations prefer to register their space objects with a state that does not have the necessary capabilities to exercise the required control and supervision of their activities as prescribed by the Registration Convention, in a similar move to the ”flag of convenience” practice.[2] If the private corporation acts on behalf or under the control of another state, then the attack would not be attributable to the state of registry. The latter would only have breached its obligation of ensuring proper supervision and control to guarantee respect of international law norms, but would not be responsible of a potential violation of Article 2(4).[3] Therefore, the victim state would be entitled to take action in self-defence against the private corporation, for instance by attacking its launching facilities located on the territory of the state of registry, without violating the sovereignty of

[1] United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (The Outer Space Treaty),* United Nations General Assembly Resolution 2222(XXI), 1966, Art. VIII.

[2] United Nations, *Convention on Registration of Objects Launched into Outer Space (The Registration Convention),* United Nations General Assembly Resolution 3235 (XXIX), 1974

[3] Bin Cheng, *Studies in International Space Law,* Calrendon Press, Oxford, 1997, pp. 638 – 639.

that state.[1] However, any action against terrestrial or extra-terrestrial assets of the non-involved state of registry would qualify as an armed attack. Finally, the aggressive conduct of a private corporation against the space assets of a state would be attributable to the state that explicitly acknowledges and adopts the act as its own.

The broader interpretation of the right to self-defence entails that states can take lawful action against aggressive acts perpetrated by non-state actors, which are non-attributable to a state. Security Council Resolutions 1368 and 1373 provide the first argument in support of this position. These documents recognize the right of states to react in self-defence against terrorist attacks perpetrated by non-state actors and non-attributable to states.[2] Judge Kooijmans and Judge Simma used this evidence in their Separate Opinions to *Armed Activities* to justify their opposition towards the judgment of the Court.[3] The advisory opinion delivered in the *Construction of a Wall* met the same criticism from Judge Kooijmans[4] and Judge Buergenthal.[5]

A significant number of scholars also support this broad interpretation of self-defence.[6] The theory of the legality to use self-defence against non-state actors for attacks non-attributable to a state has amplified especially since the

[1] Dire Tladi, "The Nonconsenting Innocent State: The Problem with Bethlehem's Principle", 107 *American Journal of International Law*, 2013, pp. 570, 572; Mary Ellen O'Connell,"Dangerous Departures", 107 *American Journal of International Law*, 2013, pp. 380, 393.

[2] United Nations, *United Nations Security Council Resolution 1368,* S/RES/1368, 2001; United Nations, *United Nations Security Council Resolution 1373,* S/RES/1373, 2001.

[3] Separate Opinion of Judge Kooijmans to the Case Concerning Armed Activities on the Territory of the Congo *(Democratic Republic of Congo v. Uganda),* Judgment, ICJ Reports 2005, para. 25; Separate Opinion of Judge Simma to the Case Concerning Armed Activities on the Territory of the Congo *(Democratic Republic of Congo v. Uganda),* Judgment, ICJ Reports 2005, para. 11.

[4] Separate Opinion of Judge Kooijmans to the Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*,* Adv. Opinion, ICJ Reports 2004, pp. 219 – 234, para. 35.

[5] Declaration by Judge Buergenthal to Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*,* Adv. Opinion, ICJ Reports, 2004, para. 6.

[6] Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 204; Cristopher Greenwood, "International Law and the Pre-Emptive Use of Force: Afghanistan, Al-Qaida and Iraq"*, San Diego International Law Journal* 7, 2003, p. 17; Ed. by Larissa Van den Herik, Nico Schrijver, *Counter-Terrorism Strategies in a Fragmented International Legal Order. Meeting the Challenges,* Cambridge University Press, 2013, p. 394; Christian Tams, James Gerard Devaney, "Applying Necessity and Proportionality to Anti-Terrorist Self-Defence", 45 *Isr.L.Rev*. 91 2012, p. 93; Nicholas Tsagourias, "Non-state actors in international peace and security. Non-state actors and the use of force", in ed. by Jean d'Aspermont, *Participants in the International Legal System. Multiple Perspectives on non-state actors in international law,* Routledge Research in International Law, 2011, p. 329; Monica Hakimi, "Defensive Force against Non-State Actors: The State of Play", *Int'L. Stud*. 91 (2015): 1-31, p. 7; Amos Enabulele, "Use of Force by International/Regional Non-State Actors: No Armed Attack, No Self-Defence", 12 *Eur. J.L. Reform* 209, 2010, p. 214; Tarcisio Gazzini, "A response to Amos Guiroa: Pre-Emptive Self-Defence Against Non-State Actors?" 13 *J. Conflict & Sec. L*. 25 2008, p. 27; Gelijn Molier, Afshin Ellian, David Suurland, *Terrorism: Ideology, Law and Policy,* Republic of Letters Publishing, 2011, p. 310.

contemporary threats posed by terrorist groups following the 9/11 attacks. The US used this justification to start the *Operation Enduring Freedom* and for the bombing of Baghdad, Israel for the attacks in Lebanon against Hamas, Turkey for the action against PKK in Iraq and, more recently, the international coalition for its actions against Daesh in Syria and Iraq.[1]

There are three grounds related to the role of the territorial state and each of them allows the victim state to use self-defence against the non-state actor acting from that particular state. Firstly, the territorial state harbours or supports the non-state actor or lost governmental authority in the area from which the attacks are launched.[2] Secondly, the territorial state is unable or unwilling to take measures against the non-state actor.[3] Thirdly, the non-state actor operates from the territory of a failing state.[4]

For the purpose of this analysis, the author of the present paper will assume that a private corporation conducting space activities will become rogue and act similar to a terrorist group. A victim state may take action in self-defence following an attack against its space assets perpetrated by the non-state actor, either by choosing a terrestrial or extra-terrestrial target. For instance, attacking the launching facility of the private corporation will not qualify as a violation of Article 2(4) of the UN Charter as long as the state on whose territory is located falls within one of the three scenarios mentioned above. The same is applicable for an attack perpetrated against one of the corporation's space objects. If the state of registry is unable or unwilling to control the activity of that asset, is a failed state or knowingly supports the activities of the corporation without adopting them, such an attack would constitute a lawful manifestation of self-defence. However, an attack against the territorial state or the state of registry's assets would amount to an unlawful use of force.

Following this discussion on the rules of attribution and responsibility of states for armed attacks and their regulatory power on the use of self-defence,

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[1] Amos Enabulele, "Use of Force by International/Regional Non-State Actors: No Armed Attack, No Self-Defence", 12 *Eur. J.L. Reform* 209, 2010, p. 214; Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, pp. 196-197; Monica Hakimi, "Defensive Force against Non-State Actors: The State of Play", *Int'L. Stud*. 91 (2015): 1-31, p. 20; Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 115.

[2] Monica Hakimi, "Defensive Force against Non-State Actors: The State of Play", *Int'L. Stud*. 91 (2015): 1-31, p. 8; Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 38.

[3] Monica Hakimi, "Defensive Force against Non-State Actors: The State of Play", *Int'L. Stud*. 91 (2015): 1-31, p. 8; Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 38.

[4] Gelijn Molier, Afshin Ellian, David Suurland, *Terrorism: Ideology, Law and Policy,* Republic of Letters Publishing, 2011, p. 320; Albrecht Randelzhofer, "Article 51", in ed. by Bruno Simma et al., *The Charter of the United Nations: A Commentary,* Oxford University Press, 2002, p. 802.

the next part of the present article will analyse the final two criteria necessary for the lawfulness of an action undertaken under Article 51 of the UN Charter: necessity and proportionality.

2.1.3 The *Caroline* Criteria

Apart from the existence of an "armed attack", its attribution to a state or, according to the broader interpretation, its role as territorial state in the perpetration of an aggressive act by non-state actors, the legality of an action in self-defence depends on two additional factors. The *Caroline* incident, which represents the expression of customary international law on self-defence, concluded that necessity and proportionality are the relevant standards that should be met.[1] This entails that an action taken in response to an armed attack must be necessary to eliminate the danger and proportional to the initial aggressive act.[2] These two criteria are cumulative in the sense that if an action falls short of one of them, it does not qualify as self-defence but as a retaliatory and unlawful act.[3] In the *Nicaragua Case,* the ICJ explicitly upheld the application of necessity and proportionality under customary international law, despite the UN Charter's omission in mentioning them as criteria for self-defence.[4] The Court reiterated the *Caroline* formula also in the *Nuclear Weapons Advisory Opinion* and in the *Oil Platforms Case.*[5]

Necessity means that the victim state has "no choice of means" to respond or avert the attack.[6] In other words, an action in self-defence is lawful only if it

[1] See page 5.

[2] Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 150; Donald R. Rothwell, "Anticipatory Self-Defence in the Age of International Terrorism", 24 *U. Queensland L.J.* 337, 2005, p. 339.

[3] Katherine Slager, "Legality, Legitimacy and Anticipatory Self-Defense: Considering an Israeli Preemptive Strike on Iran's Nuclear Program", 38 *N.C.J. Int'l L. & Com. Reg*. 267 2012 – 2013, p. 286.

[4] International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America),* Merits, Judgment, ICJ Reports 1986, p. 14, para. 176.

[5] International Court of Justice, Legality of the Threat or Use of Nuclear Weapons, Adv. Opinion, ICJ Reports 1996, p. 226*,* para. 41; International Court of Justice*,* Case Concerning Oil Platforms *(Islamic Republic of Iran v. USA),* Judgment, ICJ Reports 2003, p. 161*,* para. 75.

[6] Webster Statement (1841).

is the *only* possible option to address efficiently the aggressive act.[1] This is the expression of the relationship between forcible and non-forcible unilateral responses.[2] Usually, it is not mandatory for a victim state responding to an ongoing attack to firstly resort to non-forcible measures before an action in self-defence.[3] However, if the initial attack has already occurred but further aggressive actions are expected, the victim state might incur the obligation to resort to other measures before acting in self-defence.[4] Consequently, the requirement of necessity does not oblige the state to exhaust all possible non-forcible actions to avert an attack, but only those that can reach the same outcome as self-defence.[5]

Proportionality entails that a balance should exist between the intensity and the scope of the self-defence conduct and the threat posed by the attack.[6] This is the main perspective applied today and international law recognizes the "superior right" of the victim state to avert the armed attack.[7] Thus, the

[1] Roberto Ago, "The internationally wrongful act of the State, source of international responsibility (part 1)", Addendum to the *8th Report on State Responsibility by the Special Rapporteur*, 32nd Session of the ILC (1980), UN Doc. A/CN.4/318/Add.5 – 7, *Yearbook of the International Law Commission*, 1980, Vol. II (1), para. 120; Christian J. Tams, James G. Devaney, "Applying Necessity and Proportionality to Anti-Terrorist Self-Defence", 45 *Isr.L.Rev.* 91, 2012, p. 96; Ed. by Larissa Van den Herik, Nico Schrijver, *Counter-Terrorism Strategies in a Fragmented International Legal Order. Meeting the Challenges,* Cambridge University Press, 2013, p. 380; Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 60; Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 45.

[2] Christian J. Tams, James G. Devaney, "Applying Necessity and Proportionality to Anti-Terrorist Self-Defence", 45 *Isr.L.Rev.* 91, 2012, p. 96; Ed. by Larissa Van den Herik, Nico Schrijver, *Counter-Terrorism Strategies in a Fragmented International Legal Order. Meeting the Challenges,* Cambridge University Press, 2013, p. 380.

[3] Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 45.

[4] Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 45.

[5] Roberto Ago, "The internationally wrongful act of the State, source of international responsibility (part 1)", Addendum to the *8th Report on State Responsibility by the Special Rapporteur*, 32nd Session of the ILC (1980), UN Doc. A/CN.4/318/Add.5 – 7, *Yearbook of the International Law Commission*, 1980, Vol. II (1), para.120; Christian J. Tams, James G. Devaney, "Applying Necessity and Proportionality to Anti-Terrorist Self-Defence", 45 *Isr.L.Rev.* 91, 2012, p. 96; Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 60.

[6] Christian J. Tams, James G. Devaney, "Applying Necessity and Proportionality to Anti-Terrorist Self-Defence", 45 *Isr.L.Rev.* 91, 2012, p. 102; Ed. by Larissa Van den Herik, Nico Schrijver, *Counter-Terrorism Strategies in a Fragmented International Legal Order. Meeting the Challenges,* Cambridge University Press, 2013, p. 388; Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 64; Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 62; Bethlehem in *Chatham House Principles* (2005), p. 53; Greenwood in *Chatham House Principles (2005),* p. 53; Lowe in *Chatham House Principles (2005),* p. 54; Shaw in *Chatham House Principles (2005),* p. 55.

[7] Christian J. Tams, James G. Devaney, "Applying Necessity and Proportionality to Anti-Terrorist Self-Defence", 45 *Isr.L.Rev.* 91, 2012, p. 102; Ed. by Larissa Van den Herik, Nico Schrijver, *Counter-Terrorism Strategies in a Fragmented International Legal Order. Meeting the Challenges,* Cambridge University Press, 2013, p. 388.

response taken in self-defence might exceed the initial armed attack, but should not go beyond what is necessary to restore the *status quo ante.*[1] The ICJ upheld this position in its decision in the *Nuclear Weapons Advisory Opinion*, which did not exclude the use of nuclear weapons for the strict purpose of self-defence in extreme circumstances when *"the very survival a state would be at stake".*[2] Additionally, in order to comply with the requirement of proportionality, any collateral damage incurred must be essential to achieve the defensive scope of self-defence.[3] The ICJ concurred with this idea in the *Nicaragua Case* and in the *Nuclear Weapons Advisory Opinion.*[4]

As the present paper already discussed and demonstrated, an aggressive act perpetrated against the space assets of a state can qualify as an "armed attack" within the scope of Article 51 of the UN Charter. This mandates the victim state to act in self-defence regardless whether the act is attributable to a state or not. However, if a non-state actor perpetrates the attack without any control or direction from a state, the territorial state or the state of registry's behaviour should fall within one of the scenarios allowing an action in self-defence. Additionally, the conduct in self-defence should also fulfil the criteria of necessity and proportionality in order to be lawful. Attacking the launching base from where ASAT weapons are deployed in space is both necessary, since it would deprive the aggressor of its capabilities, as well as proportional in terms of physical and economic consequences and the geographical target. However, the victim state must be cautious not to inflict excessive casualties. For instance, if the launching base is located near a heavily populated area, the victim state must carefully assess whether the military advantage following the action in self-defence outweighs the potential civilian casualties. This assessment would also limit the type of weapons employed. If a state were victim to an attack by an on-orbit weaponized satellite, its destruction would constitute a necessary action to eliminate the danger. However, in terms of proportionality, the self-defence action should not excessively interfere with the space activities of third states or cause damage

[1] Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 61.

[2] International Court of Justice, Legality of the Threat or Use of Nuclear Weapons, Adv. Opinion, ICJ Reports 1996, p. 226*,* para. 105.

[3] International Court of Justice, Legality of the Threat or Use of Nuclear Weapons, Adv. Opinion, ICJ Reports 1996, p. 226*,* para. 105.

[4] International Court of Justice, Military and Paramilitary Activities in and against Nicaragua *(Nicaragua v. United States of America*), Merits, Judgment, ICJ Reports 1986, p. 14*,* para. 237; International Court of Justice*,* Legality of the Threat or Use of Nuclear Weapons, Adv. Opinion, ICJ Reports 1996, p. 226, para. 30.

to their space objects.[1] Generally, it is preferable to act in self-defence against ground targets, such as stations, even as a response to uses of force in space perpetrated by enemy satellites.[2]

Another particular instance is when a state is victim of an attack perpetrated by non-state actors and non-attributable to any state. In this case, a lawful action in self-defence would expressly target the assets of the non-state actor. Thus, if a private actor destroyed a state's satellite(s) or persistently damaged its space assets, the victim state should only attack the launching bases, missiles, satellites or any other capabilities possessed by that private actor. Any action against the territorial state's assets, both in space or on Earth, would fall short of the requirements of necessity and proportionality and would constitute a violation of Article 2(4) of the UN Charter.

2.1.4. Would anticipatory or pre-emptive self-defence be justified?

The *Caroline* formula provides that a state has the right to self-defence if the necessity to act is "instant, overwhelming, leaving no choice of means, and no moment of deliberation".[3] Therefore, it emphasizes the *imminence* of the attack as a prerequisite for triggering the right to self-defence.[4] As a result, a significant number of scholars support the idea that, under customary international law, *anticipatory self-defence* is permissible and lawful, thus allowing states to act in self-defence before the armed attack has actually occurred.[5] They substantiate this position based on the *"inherent right"*

[1] Fabio Tronchetti, "Legal aspects of the military uses of outer space", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 331 -381, p. 356.

[2] Fabio Tronchetti, "Legal aspects of the military uses of outer space", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 331 -381, p. 356.

[3] Webster Statement (1841).

[4] Tarcisio Gazzini, "A response to Amos Guiroa: Pre-Emptive Self-Defence Against Non-State Actors?", 13 *J. Conflict & Sec. L.* 25, 2008, p. 29; Katherine Slager, "Legality, Legitimacy and Anticipatory Self-Defense: Considering an Israeli Preemptive Strike on Iran's Nuclear Program", 38 *N.C.J. Int'l L. & Com. Reg*. 267 2012 – 2013, p. 275; Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 56.

[5] Tarcisio Gazzini, "A response to Amos Guiroa: Pre-Emptive Self-Defence Against Non-State Actors?", 13 *J. Conflict & Sec. L.* 25, 2008, p. 28; Cristopher Greenwood, "International Law and the Pre-Emptive Use of Force: Afghanistan, Al-Qaida and Iraq", *San Diego International Law Journal* 7 2003, p. 15; William O'Brien, *The Conduct of Just and Limited War,* Greenwood Publishing Group, 1981, p. 133; Anthony Clark Arend, "International Law and the Preemptive Use of Military Force", 8 *The Washington Quarterly*, 2003, p. 94; Ian Brownlie, *International Law and the Use of Force by States,* Oxford University Press, 1963, p. 257.

wording found in Article 51 of the UN Charter.[1] In his Dissenting Opinion to the *Nicaragua Case,* Judge Schwebel criticized the Court's restrictive interpretation of Article 51 of the UN Charter and declared his support for the lawfulness of anticipatory self-defence.[2] The ICJ did not express its opinion on the legality of this broader interpretation in neither of the two Advisory Opinions concerned with the legitimacy of the use of force.[3]

State practice in this regard is inconsistent, most states preferring to adopt a broader definition of "armed attack" rather than invoking anticipatory self-defence.[4] Illustrative of this position are Israel's attacks against Syria, Jordan and Egypt, US's conduct during the Cuban missile crisis and France, UK and US's patrolling of the "no-fly" zones in Iraq.[5] Even though all these instances seem manifestations of anticipatory self-defence, each state argued that they have already been victims of an armed attack.[6] Only the 1981 Israeli attack on Iraq and the 1986 US attack on Libya were explicitly justified as anticipatory self-defence.[7] The UN Security Council criticized the former as being a violation of the UN Charter and failed to reach consensus on the latter.[8]

However, even some of the scholars who strongly oppose the lawfulness of anticipatory self-defence admit that in certain cases it might be allowed. This

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[1] Katherine Slager, "Legality, Legitimacy and Anticipatory Self-Defense: Considering an Israeli Preemptive Strike on Iran's Nuclear Program", 38 *N.C.J. Int'l L. & Com. Reg*. 267 2012 – 2013, p. 282; Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 58; Rosalyn Higgins, "The Attitude of Western States Towards Legal Aspects of the Use of Force"*,* in ed. by Antonio Cassese, *The Current Legal Regulations of the Use of Force,* Martinus Nijhoff Publisher, 1986, p. 435.

[2] Dissenting Opinion of Judge Schwebel to Military and Paramilitary Activities in and against Nicaragua (*Nicaragua v. USA*), Judgment, ICJ Reports 1986, para. 347.

[3] International Court of Justice, Legality of the Threat or Use of Nuclear Weapons, Adv. Opinion, ICJ Reports 1996, p. 226; International Court of Justice, Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory, Adv. Opinion, ICJ Reports 2004, p. 136*;* Donald Rothwell, "Anticipatory Self-Defence in the Age of International Terrorism", 24 *U. Queensland L.J*. 337, 2005, pp. 345-346.

[4] Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 161.

[5] Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, pp. 162 – 163.

[6] Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, pp. 162 – 163.

[7] Donald Rothwell, "Anticipatory Self-Defence in the Age of International Terrorism", 24 *U. Queensland L.J*. 337, 2005, p. 343; Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, pp. 163-164; Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 57; Andrew Garwood-Gowers, "Pre-Emptive Self-Defence: A Necessary Development or the Road to International Anarchy", *23 Aust YBIL 51* 2004, p. 55.

[8] United Nations, *United Nations Security Council Resolution 487*, UN SCOR, 37th sess, 228th mtg, UN DOC S/RES/487, 1981; Donald Rothwell, "Anticipatory Self-Defence in the Age of International Terrorism", 24 *U. Queensland L.J*. 337, 2005, p. 345.

is the so-called "interceptive self-defence" and entails a greater level of imminence of the armed attack.[1] The difference between anticipatory and interceptive self-defence is that the former is in response to a mere "forseeable" attack whereas the latter seeks to counter an ongoing attack, including an incipient one.[2]

The concept of *pre-emptive self-defence* has been developed in the *National Security Strategy of the United States of America* issued in September 2002 by President Bush.[3] It is clear from the wording of the document that the intention was to broaden the scope of anticipatory self-defence as to include attacks uncertain in terms of time and place.[4] The formulation is strongly conflicting with the "instant" and "overwhelming" nature of the threat prescribed by the *Caroline* criteria. The US is advancing three main arguments in support of the legality of pre-emptive self-defence.[5] The first one is related to the emergence and proliferation of weapons of mass destruction; the second argument touches upon the rise of non-state actors and "rogue states" on the international plain; and the third one argues the inefficiency of traditional self-defence methods in combating these groups.[6] US reiterated its commitment towards pre-emptive self-defence in the *National Security Strategy of the United States of America* released in 2006.[7]

Some scholars support the doctrine developed by the US and reason that the "imminence" requirement must be nowadays regarded in the light of the

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[1] Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, p. 55; Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 172;

[2] Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 191.

[3] President of the United States of America, "The National Security Strategy of the United States of America", September 2002, http://www.state.gov/documents/organization/63562.pdf , last visited 28/05/2020, pp. 6, 15-16; Donald Rothwell, "Anticipatory Self-Defence in the Age of International Terrorism", 24 *U. Queensland L.J.* 337, 2005, p. 346; Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 221; Andrew Garwood-Gowers, "Pre-Emptive Self-Defence: A Necessary Development or the Road to International Anarchy", *23 Aust YBIL 51* 2004, p. 56.

[4] President of the United States of America, "The National Security Strategy of the United States of America", September 2002, http://www.state.gov/documents/organization/63562.pdf , last visited 28/05/2020, p. 15.

[5] Andrew Garwood-Gowers, "Pre-Emptive Self-Defence: A Necessary Development or the Road to International Anarchy", *23 Aust YBIL 51* 2004, p. 58.

[6] Andrew Garwood-Gowers, "Pre-Emptive Self-Defence: A Necessary Development or the Road to International Anarchy", *23 Aust YBIL 51* 2004, p. 58.

[7] President of the United States of America, "The National Security Strategy of the United States of America", March 2006, < https://www.state.gov/documents/organization/64884.pdf > last visited 28/05/2020, p. 23.

development of weapons and emergence of terrorist groups.[1] The rationale behind supporting the doctrine is that an attack perpetrated by non-state actors is harder to foresee and it might have devastating effects especially if weapons of mass destruction are employed. Therefore, effectiveness of a response in self-defence would be defeated.[2] However, most of the academics strongly oppose such an expansion of the scope of self-defence on the basis that it would lose its defensive scope and become a retaliatory measure instead.[3]

In terms of state practice, the concept of pre-emptive self-defence did not find much support. The first state to invoke a right of pre-emptive self-defence has been the US as justification for its *Operation Enduring Freedom* in Afghanistan in response to the 9/11 attacks.[4] The international community approved US's action through the adoption of Security Council Resolutions 1368[5] and 1373[6]. This consensus among states ceased to exist when US begun *Operation Iraqi Freedom* in 2003. The difference between the two operations consisted in the fact that *Enduring Freedom* came as a response to the 9/11 attacks whereas *Iraqi Freedom* was not triggered by any threat, not even an imminent one. Despite the fact that forty-five states declared their willingness to support US both military and politically, none of them did this on the basis of pre-emptive self-defence.[7] Moreover, three out of five P5 UN members, namely France, Russia and China, plus Germany openly criticized the actions

[1] Cristopher Greenwood, "International Law and the Pre-Emptive Use of Force: Afghanistan, Al-Qaida and Iraq", *San Diego International Law Journal* 7 2003, p. 16; Michael Reisman,"Editorial Comment: Assessing claims to revise the laws of war", 97 *American Journal of International Law*, 2003, p. 7.

[2] Cristopher Greenwood, "International Law and the Pre-Emptive Use of Force: Afghanistan, Al-Qaida and Iraq", *San Diego International Law Journal* 7 2003, p. 16; Michael Reisman,"Editorial Comment: Assessing claims to revise the laws of war", 97 *American Journal of International Law*, 2003, p. 7.

[3] Andrew Garwood-Gowers, "Pre-Emptive Self-Defence: A Necessary Development or the Road to International Anarchy", *23 Aust YBIL 51* 2004, p. 68; Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 216; Tarcisio Gazzini, "A response to Amos Guiroa: Pre-Emptive Self-Defence Against Non-State Actors?", 13 *J. Conflict & Sec. L.* 25, 2008, p. 30; Yoram Dinstein, *War, aggression and self-defence,* Cambridge University Press, Cambridge, 2011, p. 183; Noam Lubell, *Extraterritorial Use of Force Against Non-State Actors,* Oxford University Press, Oxford, 2010, pp. 62-63; Elizabeth Wilmshurst,"Anticipatory self-defence against terrorists", in ed. by Larissa Van den Herik, Nico Schrijver, *Counter-Terrorism Strategies in a Fragmented International Legal Order. Meeting the Challenges,* Cambridge University Press, 2013, p. 358.

[4] Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 208; Donald Rothwell, "Anticipatory Self-Defence in the Age of International Terrorism", 24 *U. Queensland L.J.* 337, 2005, p. 340; Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 115.

[5] United Nations, *United Nations Security Council Resolution 1368,* S/RES/1368, 2001.

[6] United Nations, *United Nations Security Council Resolution 1373,* S/RES/1373, 2001.

[7] Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013,, p. 221.

undertaken by US and UK.[1] In the end, even US and UK recognized the controversy of pre-emptive action and justified their operation as authorized by Security Council Resolution 1441 and, later on, as humanitarian intervention.[2]

The above discussion reveals that, while anticipatory self-defence in response to an imminent attack might be permissible under customary international law, pre-emptive self-defence is not allowed under any circumstances. Such a broad interpretation would lead to gross abuses of Article 51 of the UN Charter and some states would hide their aggressive conduct under the blanket of self-defence.

However, in the context of outer space warfare the applicability of anticipatory self-defence should be accepted. Modern technology for destroying space assets might lead to devastating consequences both in space and on Earth, affecting not only the victim state but also third parties.[3] Delaying a self-defence response might frustrate the purpose of a defensive action and the restoration of the *status quo* might become impossible. Moreover, launching an ASAT missile is far more rapid than deploying and moving troops on the ground or navies at sea. Thus, the threat is imminent and overwhelming as within the scope of the *Caroline* formula. Necessity and proportionality are still applicable to assess the legality of anticipatory self-defence. The response should not go beyond what is necessary to neutralize the aggressive act and prevent the negative consequences. For instance, if a state has reliable information that another state deployed an on-orbit weaponized satellite with the intention of attacking one of its assets, it can act in self-defence by destroying the satellite or the terrestrial control base. Such an aggressive act would not mandate, for instance, the deployment of ground forces or aerial bombardment of targets unrelated to the launching and control of the satellite.

This concludes the analysis of the *jus ad bellum* legal framework and its applicability to conflicts unfolding in outer space. So far, the article demonstrated that an attack against the space assets of another state might constitute an "armed attack" within the scope of Article 51 of the UN Charter and clarified the distinction between international responsibility under OST

[1] Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013,, p. 220; Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 118.

[2] Matthias Schmidl, *The Changing Nature of Self-Defence in International Law,* Nomos, 2009, p. 119; Christine Gray, *International Law and the Use of Force,* Third Edition, Oxford University Press, 2013, p. 221.

[3] Francis Lyall, Paul Larsen, *Space Law: A Treatise,* Ashgate, 2009, p. 528.

and attribution of an internationally wrongful act to a state. Additionally, it discussed the elements necessary for the lawfulness of an action in self-defence. The next part will address the rules of international humanitarian law and their regulatory power over outer space warfare.

3. Jus in Bello Spatialis

The law of armed conflict *(jus in bello)* or international humanitarian law comprises the body of rules and principles governing the conduct of hostilities with the aim of "mitigating the human suffering caused by war".[1] It finds expression in both customary international law and treaty law, which codified most of the rules regulating the means and methods of warfare.[2] International humanitarian law is divided in two branches, namely the "Hague law" regulating the means and methods employed during armed conflicts, and the "Geneva law", which provides protection to persons not taking part in hostilities or those rendered *hors de combat.*[3] In its case law, the ICJ held that the Hague Regulations and the four Geneva Conventions with their two Additional Protocols *"have become so closely interrelated that they are considered to have gradually formed one single complex system, known today as international humanitarian law".*[4] It is important to emphasize that any state engaged in a conflict must adapt its conduct during warfare to international humanitarian law rules, regardless whether it is the aggressor state or the state acting in self-defence according to *jus ad bellum.*[5]

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[1] Frits Kalshoven, Liesbeth Zegveld, *Constraints on the Waging of War. An Introduction to International Humanitarian Law,* 3rd Edition, ICRC, 2001, p. 12; Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 22; Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 1.

[2] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 6; Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, *Introduction;* Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 23.

[3] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, pp. 9-10; Malcolm N. Shaw, *International Law,* 7th Edition, Cambridge University Press, 2014, pp. 848 – 849.

[4] International Court of Justice, Legality of the Threat or Use of Nuclear Weapons*,* Adv. Opinion, ICJ Reports 1996, p. 226*,* pp. 226, 256.

[5] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 4.

Despite the fact that international humanitarian law does not specifically address outer space conflicts, its applicability is unquestionable.[1] This is inferred from Article III of the OST, which provides for the obligation of all states parties to conduct their activities in outer space in accordance with the rules and principles of international law.[2] Consequently, the prohibition on the use of weapons of mass destruction entails that no space object carry such load and attack a manned space vehicle, a space station or target the Earth.[3] However, considering the particularities of a conflict in the extra-terrestrial space, not all rules find application in this context.[4] The present part of the article will interpret the most relevant rules and principles pertaining to international humanitarian law in light of the specificities of an outer space war. Firstly, the discussion will focus on the characterization of aggressive military space operations as international or non-international armed conflicts.

3.1 "Military space operations" as international or non-international armed conflicts

The prerequisite for the application of international humanitarian law norms is the existence of an armed conflict, as highlighted in the Common Article 2 of the Geneva Conventions.[5] The first paragraph of the article states that the provisions of the Convention shall apply to any instances of "declared war" or "any other armed conflict" arising between two or more Contracting Parties.[6] While the two notions may seem to be synonymous, their scope differs. According to the International Committee of the Red Cross (ICRC) Commentaries to Common Article 2, "declared war" has a limited scope and

[1] Fabio Tronchetti, "Legal aspects of the military uses of outer space", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 331 -381, p. 358; Setsuko Aoki, "Law and military uses of outer space", in ed. by Ram Jakhu, Paul Stephen Dempsey, *Routledge Handbook of Space Law,* Routledge, 2017, pp. 197 – 224, p. 221.

[2] United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (The Outer Space Treaty),* United Nations General Assembly Resolution 2222(XXI), 1966, Art. III.

[3] Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, pp. 255, 256, 259.

[4] Fabio Tronchetti, "Legal aspects of the military uses of outer space", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, p. 358.

[5] *Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field,* Geneva, 12 August 1949, Art. 2; *Convention (II) for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea,* Geneva, Art. 2; *Convention (III) relative to the Treatment of Prisoners of War,* Geneva, 12 August 1949, Art. 2; *Convention (IV) relative to the Protection of Civilian Persons in Time of War,* Geneva, 12 August 1949, Art. 2; Crowe and Weston-Scheuber (2013), p. 10.

[6] Geneva Convention (I), Art. 2(1); Geneva Convention (II), Art. 2(1); Geneva Convention (III), Art. 2(1); Geneva Convention (IV), Art. 2(1).

covers only instances of aggression where at least one of the belligerents issued a declaration of war.[1] Even if such a declaration is not followed by the use of armed force between belligerents, international humanitarian law still applies, thus conferring protection to enemy nationals finding themselves on the territory of the opposing state.[2] The concept of "armed conflict" is wider and does not depend on formalities such as the declaration of war.[3] In this case, the factual existence of an armed conflict prevails over the formal recognition of such a state of play.[4] This aspect bears a particular importance, since, after the conclusion of the UN Charter, states have seldom had recourse to formal declarations of war.[5] Even if none of the parties to the conflict acknowledges the existence of a state of war, humanitarian law still applies if the factual evidence proves the reality of the hostile actions between the parties.[6] The applicability of *jus in bello* to armed conflicts short of a formal declaration of war is supported by decisions of the UN ad-hoc international criminal tribunals tasked with prosecuting war crimes and crimes against humanity committed in Yugoslavia (ICTY) and Rwanda (ICTR).[7] The ICTY in the *Prosecutor v. Milutinović* and *Prosecutor v. Blaškić* cases also reiterated the determination of the existence of a state of war solely based on the factual proofs, regardless whether the belligerents acknowledge it.[8]

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[1] International Committee of the Red Cross, *Commentary on the First Geneva Convention: Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field,* 2nd Edition, 2016.

[2] International Committee of the Red Cross, *Commentary on the First Geneva Convention: Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field,* 2nd Edition, 2016.

[3] International Committee of the Red Cross, *Commentary on the First Geneva Convention: Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field,* 2nd Edition, 2016.

[4] International Committee of the Red Cross, *Commentary on the First Geneva Convention: Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field,* 2nd Edition, 2016.

[5] International Committee of the Red Cross, *Commentary on the First Geneva Convention: Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field,* 2nd Edition, 2016.

[6] International Committee of the Red Cross, *Commentary on the First Geneva Convention: Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field,* 2nd Edition, 2016.

[7] International Criminal Tribunal for the Former Yugoslavia, *Prosecutor v. Ljube Boškoski and Johan Tarčulovski,* Case No. IT-04-82-T, Judgment, 10 July 2008, para. 174; International Criminal Tribunal for Rwanda, *Prosecutor v. Jean-Paul Akayesu,* Case No. ICTR-96-4-T, Judgment, 2 September 1998, para. 603.

[8] International Criminal Tribunal for the Former Yugoslavia, *Prosecutor v. Milan Milutinović, Nikola Šainović, Dragoljub Ojdanić, Nebojša Pavković, Vladimir Lazarević, Sreten Lukić,* Case No. IT-05-87-T, Judgment, 26 February 2009, para. 125; International Criminal Tribunal for the Former Yugoslavia, *Prosecutor v. Tihomir Bla[ki],* Case No. IT-95-14-T, Judgment, 3 March 2000, para. 82.

According to the ICTY Appeals Chamber judgment in the *Prosecutor v. Tadić* case, *"an armed conflict exists whenever there is a resort to armed force between States or protracted armed violence between governmental authorities and organised armed groups or between such groups within a State".*[1] The Tribunal upheld this interpretation in the *Prosecutor v. Kunarać* case.[2] The definition recognizes both types of armed conflict, according to the nature of the belligerents involved. "Resort to armed forces between States" characterizes an international armed conflict, while the existence of "protracted violence" between non-armed groups and governmental forces or solely among "organised armed groups" within a state is the feature of non-international armed conflicts.[3] An international armed conflict is present even if only one state unilaterally uses force against another state, which cannot or does not respond in self-defence.[4] In terms of the actors involved in the conduct of hostilities, the International Criminal Court (ICC) held in the *Bemba* case that *"an international armed conflict exists in case of armed hostilities between States through their respective armed forces or other actors acting on behalf of the State".*[5] Consequently, the existence of an international armed conflict does not depend on the use of regular armed forces as long as the actors involved are acting on behalf of the state according to the rules on state responsibility. Moreover, international jurisprudence and a significant number of scholars support the idea that the armed conflict among states does not have to reach a certain level of intensity to trigger the

[1] International Criminal Tribunal for the Former Yugoslavia, *Prosecutor v. Dusko Tadić a/k/a "Dule",* Decision on the Defence Motion for Interlocutory Appeal on Jurisdiction, 2 October 1995, para. 70.

[2] International Criminal Tribunal for the Former Yugoslavia, *Prosecutor v. Dragoljub Kunarac, Radomir Kovac and Zoran Vukovic,* Case No. IT-96-23 & IT-96-23/1-A, Appeals Chamber, Judgment, 12 June 2002, paras. 55-56.

[3] Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 11.

[4] International Committee of the Red Cross, *Commentary on the First Geneva Convention: Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field,* 2nd Edition, 2016

[5] International Criminal Court, *Situation in the Central African Republic in the Case of the Prosecutor v. Jean-Pierre Bemba Gombo,* Case No. ICC-01/05-01/08, Decision Pursuant to Article 61(7)(a) and (b) of the Rome Statue on the Charges of the Prosecutor Against Jean-Pierre Bemba Gombo, Pre-Trial Chamber II, 15 June 2009, para. 223

applicability of international humanitarian law.[1] What is required for the existence of an international armed conflict is intention on behalf of one of the belligerents.[2] A mere frontier incident triggered by a misunderstanding cannot be qualified as such.[3] However, if the victim states decides it is necessary to act in self-defence or if a state intentionally provoked the incident, then it can be qualified as an international armed conflict.[4]

Considering the fact that the present article addresses jus ad bellum, a regime applicable only to international armed conflicts, the international humanitarian law analysis in the context of outer space warfare will also be limited to international armed conflicts for purposes of consistency.

An attack against the space object of a state, through either an ASAT weapon or an on-orbit weaponized satellite, can be considered an armed attack in the sense of *jus ad bellum.*[5] Therefore, such aggressive acts in outer space can also qualify as "a resort to armed force between States" as within the scope of the *Tadić* definition. Additionally, in contrast to the regime regulating the legality of the use of force, which requires a certain level of gravity to trigger the right to self-defence, international humanitarian law is applicable regardless of the intensity of the conflict. Moreover, the ICRC Commentary on Common Article 2 states that those cyber operations having the same effect as a kinetic attack would also constitute an international armed conflict.[6] Consequently, even a cyber-attack against the satellite or the

[1] International Criminal Tribunal for the Former Yugoslavia, *Prosecutor v. Zejnil Delalić, Zdravko Mucić also known as "Pavo", Hazim Delić, Esad Landžo also known as "Zenga",* Case No. IT-96-21-T, Judgment, 16 November 1998, para. 184; International Criminal Tribunal for the Former Yugoslavia, *Prosecutor v. Dusko Tadić a/k/a "Dule",* Decision on the Defence Motion for Interlocutory Appeal on Jurisdiction, 2 October 1995, para. 70; International Criminal Court, *Situation in the Democratic Republic of the Congo in the Case of the Prosecutor v. Thomas Lubanga Dyilo,* Case No. ICC-01/04-01/06, Decision on the Confirmation of Charges, Pre-Trial Chamber I, 29 January 2007, para. 207; Hans Peter Gasser, "International humanitarian law. An introduction", in ed. by Hans Haug, *Humanity for All: The International Red Cross and Red Crescent Movement,* Henry Dunant Institute, 1993, pp. 510 – 511; Eric David, *Principes de droit des conflits armés,* 5th Edition, Bruylant, 2012, p. 122; Dino Kritsiotis, "The Tremors of Tadić", *Israel Law Review*, Vol. 43, 2010, pp. 262-300, pp. 278 – 279; Andrew Clapham, "The Concept of International Armed Conflict", in ed. by Andrew Clapham, Paola Gaeta, Paola, Marco Sassoli, *The 1949 Geneva Conventions: A Commentary,* Oxford University Press, 2015, pp. 3-26, pp. 13-16; Michael Schmitt, "Classification of cyber conflict", *Journal of Conflict and Security Law*, Vol. 17, No. 2, 2012, pp. 245 – 260, p. 240.

[2] Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 152.

[3] Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 152.

[4] Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 152.

[5] See Part 2.1.1

[6] International Committee of the Red Cross, *Commentary on the First Geneva Convention: Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field,* 2nd Edition, 2016.

launching facility of a state might trigger the application of international humanitarian law as long as it leads to the destruction of civilian or military assets or to the death or injury of members of the armed forces or civilians.[1] For the purpose of maintaining the space-centric approach of the present paper, the destruction, death or injury following a cyber-attack should occur in space or the attack should target a space asset. One such example would constitute a cyber-attack aimed at hijacking the commands of the launching and control facility of a state transmitted to a manned space vehicle. Such an aggressive act has the potential of endangering the life of the personnel on board and, thus, may qualify as an international armed conflict.

Having established the international character of an outer space conflict for the purposes of the present article, the following sub-chapter will discuss the status of astronauts during the conduct of hostilities.

3.2 Legal Status of Astronauts in Outer Space Warfare

The cornerstone of international humanitarian law is the principle of distinction between combatants and civilians, thus obliging the belligerents to distinguish between persons included in the first category, whom are lawful targets, and those falling within the second category, who "enjoy general protection against dangers arising from military operations".[2] In the *Nuclear Weapons Advisory Opinion,* the ICJ held that the principle of distinction is one of the "cardinal principles" of international humanitarian law and part of customary international law.[3] Apart from the protection conferred to civilians, this distinction is also important for the applicability of the specific rules regulating the status of combatants during hostilities.

According to Article 43(1) of the Additional Protocol I to the Geneva Conventions, the armed forces of a state "consist of all organized armed forces, groups and units which are under a command responsible to that Party for the conduct of its subordinates, even if that Party is represented by a

[1] International Committee of the Red Cross, *Commentary on the First Geneva Convention: Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field,* 2nd Edition, 2016.

[2] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 51(1); Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 27; Nils Melzer, "The Principle of Distinction Between Civilians and Combatants", in ed by. Andrew Clapham, Paola Gaeta, *The Oxford Handbook of International Law in Armed Conflict,* Oxford University Press, 2014, p. 297; Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, p. 3.

[3] International Court of Justice, Legality of the Threat or Use of Nuclear Weapons*,* Adv. Opinion, ICJ Reports 1996, p. 226, paras. 78-79.

government or an authority not recognized by an adverse Party".[1] This definition is now part of customary international law.[2] Irregular forces also fall within the purpose of this definition as long as they fulfil the requirements of organization and being under a command responsible before one of the parties to the conflict.[3] On the one hand, members of regular forces, with the exception of medical and religious personnel, automatically enjoy combatant status.[4] Even if they contribute indirectly to the war effort and perform, for instance, only administrative tasks, as long as they are authorized to fight as part of the armed forces, they enjoy combatant status.[5] On the other hand, in order to be considered lawful combatants, members of irregular forces must fulfil four cumulative conditions prescribed by the Hague Regulation (IV) in Article I and by the Geneva Convention (III) in Article 4.[6] Irregulars must be under responsible command, must bear a distinctive and fixed emblem, carry arms openly and comply with international humanitarian law rules.[7] According to Article 47 of the Additional Protocol I to the Geneva Conventions, a mercenary shall not enjoy combatant status or the rights granted to prisoners of war.[8] This means that a mercenary may be subject to prosecution under the laws of the detaining state.[9] A mercenary is a person specifically recruited for taking part in the hostilities in exchange of monetary

[1] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 43(1); Nils Melzer, "The Principle of Distinction Between Civilians and Combatants", in ed by. Andrew Clapham, Paola Gaeta, *The Oxford Handbook of International Law in Armed Conflict,* Oxford University Press, 2014, p. 302.

[2] Nils Melzer, "The Principle of Distinction Between Civilians and Combatants", in ed by. Andrew Clapham, Paola Gaeta, *The Oxford Handbook of International Law in Armed Conflict,* Oxford University Press, 2014, p. 302.

[3] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 43; Nils Melzer, "The Principle of Distinction Between Civilians and Combatants", in ed by. Andrew Clapham, Paola Gaeta, *The Oxford Handbook of International Law in Armed Conflict,* Oxford University Press, 2014, p. 303; Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, p. 15.

[4] Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 188; Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, p. 13.

[5] Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 188; Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, p. 13.

[6] *Convention (IV) respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land,* The Hague, 18 October 1907, Art. I; *Convention (III) relative to the Treatment of Prisoners of War,* Geneva, 12 August 1949, Art. IV.

[7] *Convention (IV) respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land,* The Hague, 18 October 1907, Art. I; *Convention (III) relative to the Treatment of Prisoners of War,* Geneva, 12 August 1949, Art. IV.

[8] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 47.

[9] Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 99.

compensation, and is not a national or a resident of a party to the conflict.[1] Private contractors not qualifying as mercenaries shall be regarded as part of the irregular armed forces of the contracting state and, in principle, shall be entitled to combatant status and prisoner of war privileges, as long as they are directly involved in the hostilities.[2] Another category of persons entitled to a treatment similar to prisoners of war consists of combatants who reached neutral territory and must be interned, as prescribed by international law.[3] A person feigning civilian status while also engaging in hostilities is an unlawful combatant.[4] Consequently, he is a legitimate military target but does not enjoy the privileges granted to lawful combatants or the protection conferred by the civilian status.[5] Lawful combatants who are part of the regular or irregular armed forces shall lose the right to be prisoners of war if they do not clearly distinguish from civilians by wearing a uniform or an emblem and by carrying weapons in the open during military engagement.[6] In case of doubt as to the status of a person, "that person shall be considered to be a civilian".[7]

Once a person qualifies as combatant, he becomes a legitimate target for the armed forces of the adversary at any time, until he surrenders or becomes *hors de combat.*[8] Even if the combatant is targeted far behind the combat lines, he remains a legitimate target.[9] A lawful combatant also enjoys certain rights and privileges stemming from this status. For instance, he has immunity from prosecution in relation to lawful acts perpetrated during hostilities, but not for

[1] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 47.

[2] Nils Melzer, "The Principle of Distinction Between Civilians and Combatants", in ed by. Andrew Clapham, Paola Gaeta, *The Oxford Handbook of International Law in Armed Conflict,* Oxford University Press, 2014, p. 304.

[3] *Convention (III) relative to the Treatment of Prisoners of War,* Geneva, 12 August 1949, Art. 4(B)(2).

[4] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 29.

[5] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 29; Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, p. 20.

[6] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 44(3)(4); Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, pp. 384-386.

[7] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 50(1); Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, p. 23.

[8] Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 188.

[9] Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 188.

those actions in breach of international humanitarian law.[1] If captured by the adversary, combatants enjoy protection under the Geneva Convention (III), which prescribes a series of basic principles pertaining to the treatment of prisoners of war.[2] Article 17 of the Convention prescribes that a captured combatant has the obligation to provide only his full name, rank, date of birth and serial number if applicable.[3] The capturing authorities should not request or coerce the prisoner to provide any other information.[4] The Convention protects prisoners of war from physical or mental torture and any other form of coercion and prescribes the obligation of the capturing state to ensure a non-discriminatory treatment towards all prisoners.[5] Unlike mercenaries, spies and unlawful combatants, prisoners of war are not liable for prosecution based on their participation in the hostilities and, thus, shall not be kept under punitive conditions.[6] This rationale stems from Article 43(2) of the Additional Protocol I, which states that combatants "have the right to participate directly in hostilities".[7] Consequently, a belligerent can take prisoners of war only for the purpose of rendering them *hors de combat* and, thus, neutralize their contribution to the conflict.[8]

There is no explicit definition of "astronaut" included in the UN outer-space related treaties.[9] Nowadays, it is considered that this status involves an

[1] Nils Melzer, "The Principle of Distinction Between Civilians and Combatants", in ed by. Andrew Clapham, Paola Gaeta, *The Oxford Handbook of International Law in Armed Conflict,* Oxford University Press, 2014, p. 305.

[2] *Convention (III) relative to the Treatment of Prisoners of War,* Geneva, 12 August 1949; Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 101.

[3] *Convention (III) relative to the Treatment of Prisoners of War,* Geneva, 12 August 1949, Art. 17.

[4] International Committee of the Red Cross, *Commentary on the Third Geneva Convention: Convention (III) relative to the Treatment of Prisoners of War,* 2020, Art. 17; Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 103.

[5] *Convention (III) relative to the Treatment of Prisoners of War,* Geneva, 12 August 1949, Arts. 16, 17.

[6] Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 102.

[7] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 43(2); Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 102.

[8] Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 102

[9] Francis Lyall, Paul Larsen, *Space Law: A Treatise,* Ashgate, 2009, p. 131; Frans Von der Dunk, "International space law", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 29-126, p. 80.

altitude component.[1] As a result, for the purposes of the present paper, any person reaching an altitude higher than 90-100 km above sea level would qualify as an astronaut, since this would be the proper lower limit of outer space as discussed in Part 2.1.1 of the present paper. In accordance with the outer-space related treaties, astronauts are "envoys of mankind" and state parties should render to them any possible assistance in carrying out activities in outer space or in case of distress.[2] Moreover, state parties have the obligation to return the personnel on board of a space object to the launching authority.[3] However, these obligations become superfluous if astronauts on board of a space vehicle are actually taking part in a conflict unfolding in outer space. In this context, astronauts may become combatants and, consequently, fall within the scope of international humanitarian law rules. Additionally, the principle of distinction in the context of outer space conflict will operate to differentiate between combatant astronauts and civilian astronauts. The following paragraphs will analyse various scenarios concerning the involvement of astronauts in outer space warfare and the consequences it might have on their status.

Space-faring nations already have established military forces tasked with conducting activities in outer space, either as an independent branch or as part of their air forces. The US is the only country having a separate Space Force within its military structure.[4] India has a joint space command, dependent on a certain degree to the other military branches, while Australia, China, France, Russia and the United Kingdom integrated a space component into their

[1] Francis Lyall, Paul Larsen, *Space Law: A Treatise,* Ashgate, 2009, p. 131; Frans Von der Dunk, "International space law", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 29-126, p. 80.

[2] United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (The Outer Space Treaty),* United Nations General Assembly Resolution 2222(XXI), 1966 , Art. V.

[3] United Nations, *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (The Rescue Agreement),* United Nations General Assembly Resolution 2345 (XXII), 1967 Art. 4.

[4] Leonard David, "Space Force: What will the new military branch actually do?", 9 February 2020, <https://www.space.com/united-states-space-force-next-steps.html>, last visited on 30/05/2020.

aerospace forces.[1] Any person part of these structures and sent into space would qualify as an astronaut. Moreover, since space forces are part of the national military, he would also qualify as a lawful combatant during hostilities.

Considering the increasing role of the private industry in space affairs, a potential outer space conflict will also display a significant use of "irregular forces" or even "mercenaries" as within the scope of international humanitarian law. If a country uses the space capabilities, assets and personnel of a space-faring corporation registered on its territory, the persons working for that company and participating in the hostilities on behalf of the state would qualify as private contractors and, thus, irregular forces. In regards to the requirements for qualifying as lawful combatants, the specificities of an outer space conflict would not accommodate the obligation imposed on the combatants to carry their arms openly. For the purposes of the lawfulness of combatant status, an emblem of the private company placed on the space vehicle and on the personnel's suits would suffice. Consequently, as long as an astronaut, employee of a private corporation acting on behalf of one of the belligerents, is on a space station from which attacks are launched or on board of a space vehicle carrying a weaponized object and bearing a distinctive emblem, he shall qualify as a lawful combatant. However, feigning civilian status while involving in combat would render astronauts as unlawful combatants not entitled to prisoner of war status.

If astronauts falling within one of the categories described above experience distress or are forced to make an emergency landing, they can be captured as prisoners of war. According to the principle of *lex specialis derogat legi generali,* in the context of ongoing hostilities, international humanitarian law prevails over other legal regimes.[2] The outer space treaties represent the general law applicable to space activities at any time, while an armed conflict represents a specific situation falling within the scope of the particular regime of international humanitarian law. As a result, belligerents in an outer space

[1] Elsa Kania, "China Has a 'Space Force'. What Are Its Lessons for the Pentagon?", 29 September 2018, < https://www.defenseone.com/ideas/2018/09/china-has-space-force-what-are-its-lessons-pentagon/151665/>, last visited on 30/05/2020; Vivek Raghuvanshi, "India to launch a defense-based space research agency", 12 June 2019, < https://www.defensenews.com/space/2019/06/12/india-to-launch-a-defense-based-space-research-agency/>, last visited on 30/05/2020; FLTLT Gene Elliott, "First Space Operations Unit", *Air Force*, the official newspaper of the Royal Australian Air Force, 21 May 2015; Russian Ministry of Defence Website – Aerospace Defence Forces, https://eng.mil.ru/en/structure/forces/cosmic.htm , last visited on 30/05/2020; Andrew Chuter, "Former fighter pilot picked to lead British military's space command", 15 January 2020, < https://www.defensenews.com/global/europe/2020/01/15/former-fighter-pilot-picked-to-lead-british-militarys-space-command/ >, last visited on 30/05/2020.

[2] Michael Bothe, *The handbook of international humanitarian law,* Oxford University Press, 2013, p. 74.

conflict would be entitled to take astronauts, who are lawful combatants, as prisoners of war and would no longer incur the obligation to return them to the launching state as provided by the Rescue Agreement.

Another scenario relevant for the present analysis implies a company acting on behalf of one of the belligerents, which is not incorporated in one of the states participating in the hostilities and receives a significant monetary compensation for its involvement. Employees of such a private enterprise sent in space would qualify as astronauts under the outer space treaty framework, but as mercenaries under international humanitarian law. As a result, in case of emergency landing on the territory of one of the belligerents or of a neutral country, they would not enjoy the privileges afforded to prisoners of war and could be liable under the laws of that state. The same rule applies for combatant astronauts not wearing a uniform distinguishing them from civilian astronauts or being on board of an unmarked space vehicle.

In relation to civilian astronauts performing peaceful activities not related to the unfolding hostilities, both belligerents and neutral states will have the same obligations to assist them in case of emergency or distress and return them to the launching state. Moreover, civilian astronauts shall not be legitimate targets for attack. As prescribed by Additional Protocol (I) to the Geneva Conventions, in case of doubt as to the status of an astronaut, he should be considered civilian.

Having discussed the status of astronauts during outer space warfare, the next part of the present article will discuss the principle of distinction in relation to targeted objects. The analysis will focus on dual-use satellites, which might pose significant issues to the applicability of this principle.

3.3 Dual-Use Satellites – legitimate military objective?

According to Articles 48 and 52(2) of the Additional Protocol (I) to the Geneva Conventions, parties to a conflict must direct their attacks only against military objectives and are prohibited from perpetrating aggressive actions against civilian targets.[1] In order to establish the scope of application of the present rule, it is necessary to define the term "military objective". Additional Protocol (I) to the Geneva Conventions states that *"military objectives are limited to those objects which by their nature, location, purpose or use make an effective contribution to military action and whose partial or total destruction, capture or neutralisation (...) offers a definite*

[1] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Arts. 48, 52(2).

military advantage".[1] This definition is now part of customary international law.[2] Consequently, there are two main elements that must be taken into consideration when assessing whether a target qualifies as a military objective. Firstly, it must effectively contribute to the military action and, secondly, its total or partial destruction or neutralization must trigger a clear and perceptible military advantage.[3]

An object might have a military nature through either its "nature", "use", "purpose" or "location". The nature of an object refers to its intrinsic attributes that contribute effectively to the conduct of hostilities.[4] Therefore, objects such as military aircraft, military camps, fortifications, weapons systems and others are clearly military objectives. The criterion of "use" refers to the object's present function, while "purpose" qualifies the object as military according to the intended use established by the belligerent.[5] Sometimes, an object might have a military nature and, thus, run the risk of being targeted simply because its location is a military objective.[6] The presence of civilians in the proximity of the military objective does not change its status and a belligerent can still target it.[7] However, any attack on a military objective, which might cause incidental civilian damage, must respect the principle of proportionality.[8] This entails that the casualties should not be excessive in relation to the anticipated military advantage.[9]

It is clear that military satellites qualify as military objectives because of their "nature".[10] The question is whether dual-use satellites should be regarded as

[1] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 52(2).

[2] Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, p. 29; Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 520.

[3] Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 520.

[4] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 88.

[5] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 89.

[6] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 89.

[7] Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, p. 31; Gary Solis, *The Law of Armed Conflict. International Humanitarian Law in War,* Cambridge University Press, 2010, p. 522; Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 55.

[8] Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 55.

[9] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 51(5)(b).

[10] Setsuko Aoki, "Law and military uses of outer space", in ed. by Ram Jakhu, Paul Stephen Dempsey, *Routledge Handbook of Space Law,* Routledge, 2017, pp. 197 – 224, p. 222.

legitimate military objectives. The answer is in the affirmative as long as that satellite also performs a military function during the conflict. For instance, a belligerent can damage or destroy a military satellite also used for civilian purposes or, at least, deny access to it through jamming or cyberattacks.[1] Similarly, a civilian satellite whose purpose has been changed during the conflict to perform military functions qualifies as a legitimate target. This is similar to the instance of attacking a church or mosque whose steeple or minaret the armed forces are using as a sniper's nest.[2] Despite its initial civilian nature, the usage of an object for military purposes makes it a legitimate target and its destruction or neutralization might bring a military advantage to the adversary. In the case of satellites, this might materialize in denial of access to crucial information or imagery or to the actual elimination of a threat to the space assets of the attacking state if the targeted satellite is weaponized.

As inferred from the first paragraph of the present part, a purely military or dual-use satellite used for military purposes remains a legitimate target despite its proximity to civilian space assets. In such cases, the belligerents should use weapons that would not cause excessive damage to these objects located near the target. For instance, an attack, which might cause enormous amounts of space debris that might negatively affect civilian satellites, thus jeopardizing their functioning, might breach the principle of proportionality. Space debris is an issue connected to another principle of international humanitarian law, namely environmental protection, and the following part of the present paper will address this aspect.

3.4 Protection of Environment in Outer Space Warfare

International humanitarian law contains specific rules providing for the protection of environment during the conduct of hostilities. On the one hand, Article 35(3) of the Additional Protocol (I) to the Geneva Conventions prescribes that *"it is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment".*[3] This rule protects the environment in its own right.[4] On the other hand, Article 55(1) of the same legal instrument

[1] Setsuko Aoki, "Law and military uses of outer space", in ed. by Ram Jakhu, Paul Stephen Dempsey, *Routledge Handbook of Space Law,* Routledge, 2017, pp. 197 – 224, p. 222.

[2] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 91.

[3] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 35(3).

[4] Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013.

links the protection afforded to the natural environment to its importance to the health or survival of the population, regardless of its status as combatants or civilians.[1] Therefore, the protection of environment under international humanitarian law is a two-pronged norm, firstly safeguarding the environment in its own right and, secondly, extending protection to parts of the environment essential for the life and health of people. Any incidental damage caused to the natural environment following an attack must respect the principle of proportionality, an idea upheld by the ICJ in the *Nuclear Weapons Advisory Opinion.*[2] Consequently, if the effects on the environment outweigh the obtained military advantage, the attack is in breach of the principle of proportionality.[3] The most famous example of destruction of a part of the natural environment during warfare is the chemical deforestation using Agent Orange in the Vietnam War.[4]

A belligerent must exercise caution also when attacking a military objective containing dangerous forces, such as oil refineries, since the attack might release dangerous substances threatening the environment and affecting the health and life of the population.[5] Another important aspect in relation to the protection of environment during warfare is the precautionary principle, which states that scientific uncertainty as to the effects of a certain military operation on the environment does not constitute a mitigating circumstance for the belligerents.[6] In its 1993 report to the UN General Assembly, the ICRC commented that the precautionary principle is *"an emerging, but generally recognized principle of international law (whose object it is) to anticipate and prevent damage to the environment and to ensure that, where there are threats of serious or irreversible damage, lack of scientific certainty shall not be used as a reason to postpone any measures to prevent such*

[1] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Art. 55(1).

[2] International Court of Justice, Legality of the Threat or Use of Nuclear Weapons, Adv. Opinion, ICJ Reports 1996, p. 226, para. 30.

[3] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 177; Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 68; Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, p. 145.

[4] Jean-Marie Henckaerts, Dana Constantin, "Protection of the Natural Environment", in ed. by Andrew Clapham, Paola Gaeta, *The Oxford Handbook of International Law in Armed Conflict,* Oxford University Press, 2014, p. 480; Jonathan Crowe, Kylie Weston-Scheuber, *Principles of International Humanitarian Law,* Edward Elgar Publishing Limited, 2013, p. 68.

[5] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 176.

[6] Jean-Marie Henckaerts, Louise Doswald-Beck, *Customary International Humanitarian Law,* Volume I, ICRC, Cambridge University Press, 2009, p. 150.

damage".[1] The ICJ confirmed the applicability of this principle during armed conflict in its jurisprudence.[2]

In order to establish the applicability *ratione materiae* of the aforementioned rules of international humanitarian law, it is necessary to define the concept of "natural environment". International law does not contain a precise, uniform definition of what constitutes "natural environment", and Additional Protocol (I) to the Geneva Convention is silent on this matter.[3] The ICRC Commentary emphasizes that the concept should be broadly interpreted to cover agricultural areas, drinking water, forests, and other vegetation, the flora, fauna, biological and climatic elements.[4] Consequently, "natural environment" designates everything that is not made by man, including the atmosphere.[5]

According to the definition and interpretation put forward in the previous paragraph, outer space would clearly qualify as a "natural environment" since it is not a human creation. At a first glance, it might seem that international humanitarian law protects environmental elements strictly connected to Earth. However, firstly, Article 35(3) of the Additional Protocol (I) to the Geneva Conventions does not limit the scope of the concept of "natural environment" to strictly terrestrial elements. Secondly, considering that the present paper discusses outer space warfare and interprets international law rules in this particular context, outer space, including the moon and other celestial bodies, shall be considered a "natural environment" falling within the scope of Article 35(3) of the Additional Protocol (I) to the Geneva Conventions.

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[1] International Committee of the Red Cross, *Protection of the Environment in Time of Armed Conflict,* Report submitted by the ICRC to the 48th session of the United Nations General Assembly, 17 November 1993

[2] International Court of Justice, Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of 20 December 1974 in the Nuclear Tests *(New Zealand v. France)* Case, Order, ICJ Reports 1995, p. 288, paras. 34-35; International Court of Justice, Legality of the Threat or Use of Nuclear Weapons, Adv. Opinion, ICJ Reports 1996, p. 226, para. 32.

[3] Jean-Marie Henckaerts, Dana Constantin, "Protection of the Natural Environment", in ed. by Andrew Clapham, Paola Gaeta, *The Oxford Handbook of International Law in Armed Conflict,* Oxford University Press, 2014, p. 470; Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict,* Cambridge University Press, 2004, p. 184.

[4] International Committee of the Red Cross, *Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I),* 8 June 1977, Commentary of 1987, Commentary on Article 55.

[5] Jean-Marie Henckaerts, Dana Constantin, "Protection of the Natural Environment", in ed by. Andrew Clapham, Paola Gaeta, *The Oxford Handbook of International Law in Armed Conflict,* Oxford University Press, 2014, p. 471.

Space debris following an attack against a space object is the main issue that might affect the outer space environment during the conduct of hostilities.[1] In 2007, China destroyed one of its out-of-function satellites by using an ASAT weapon, while in 2009 two satellites collided.[2] Only these two incidents produced an amount of debris, which in 2012 accounted for 36% of all low-Earth orbit objects.[3] This is illustrative of the negative impact an ASAT weapon attack might have on the space environment. Due to the velocity in outer space, even a debris particle of a size no more than 1 cm may cause significant damage to a functioning satellite or cause a fatal reaction.[4] Moreover, astronauts performing activities outside their space vehicles might sustain severe injuries, since their equipment does not provide adequate protection against space debris.[5] Consequently, an ASAT attack during outer space hostilities might contaminate the extra-terrestrial environment with space debris, harmfully interfering with the peaceful activities of other states, potentially causing damage to civilian satellites or even military space objects of non-belligerent states and endangering the life of civilian astronauts. Belligerents in an outer space conflict should limit their attacks with ASAT missiles only to situations of outmost necessity, when the military advantage following the attack would clearly outweigh the negative impact of the resulting space debris. Military operations aiming at jamming, spoofing or incapacitating a satellite using an on-orbit weaponized space object might be preferable and would not run the risk of breaching international humanitarian law rules pertaining to environmental protection.

Many satellites are using nuclear power sources (NPS) because this is the only energy option adequate for a wide range of long-term space missions.[6] During an outer space conflict, an attack against an NPS satellite might release radioactive material in the extra-terrestrial environment, potentially affecting participants in outer space activities.[7] However, since such an attack would

[1] Lotta Viikari, "Environmental aspects of space activities", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 717 – 768, p. 719; Francis Lyall, Paul Larsen, *Space Law: A Treatise,* Ashgate, 2009, p. 301; Isabella Diederiks-Verschoor, Vladimir Kopal, *An Introduction to Space Law,* Kluwer Law International, 2008, p. 127.

[2] Lotta Viikari, "Environmental aspects of space activities", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 717 – 768, p. 721.

[3] National Aeronautics and Space Administration (NASA), *Orbital Debris Quarterly News*, Volume 16, Issue 3, July 2012, p. 2.

[4] Lotta Viikari, "Environmental aspects of space activities", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 717 – 768, pp. 721-722.

[5] Lotta Viikari, "Environmental aspects of space activities", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 717 – 768, pp. 721-722.

[6] Lotta Viikari, "Environmental aspects of space activities", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 717 – 768, p. 724.

[7] Lotta Viikari, "Environmental aspects of space activities", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 717 – 768, p. 724.

also cause debris, contaminated fragments might also fall on Earth. Such an incident might contaminate an entire area, the waters and/or the soil and subsoil, endangering the life and health of the population. One such example is the accidental re-entry, in 1978, of Cosmos-954, a Soviet NPS satellite that disintegrated on Canadian territory.[1] It caused the contamination of a significant portion of land, albeit unpopulated.[2] Consequently, an attack against an NPS satellite during outer space conflict would breach international humanitarian law. Belligerents should avoid perpetrating kinetic attacks against space objects powered by nuclear sources and should choose other means to incapacitate the target or deny the adversary access to its functions.

4. Conclusion

This second part of the article on the legal implications of outer space warfare proved that an attack against the satellite of a state can constitute a prohibited use of force and can mandate the victim state to act in self-defence. Despite the seemingly mild nature compared to other aggressive acts perpetrated during hostilities, attacks in outer space can reach the necessary gravity threshold to qualify as an armed attack. Regarding the right to self-defence, the paper demonstrates that a victim state can take defensive actions against aggressive acts perpetrated by both states and non-state actors, an important finding considering the increased role of the private industry in outer space activities. Moreover, the analysis proves that there is a difference between the international responsibility prescribed in the Outer Space Treaty and the one stemming from the rules of state attribution. The evolving technology employed in outer space confer rapidity in the perpetration of an attack, as well as increased lethality. Consequently, anticipatory self-defence should be lawful in this context to avoid frustrating the defensive purpose of the action.

In terms of jus in bello, the article addresses three main issues stemming from the application of international humanitarian law to the particularities of outer space warfare. It firstly establishes the international character of a space conflict. Secondly, it clarifies the legal status of astronauts in the context of outer space warfare. While astronauts directly involved in the conduct of

[1] Lotta Viikari, "Environmental aspects of space activities", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 717 – 768, p. 724.

[2] Lotta Viikari, "Environmental aspects of space activities", in ed. by Frans Von der Dunk, Fabio Tronchetti, *Handbook of Space Law,* Edward Elgar Publishing, 2015, pp. 717 – 768, p. 724.

hostilities would qualify as combatants, those performing peaceful exploration activities would keep the status of civilians. States would be allowed to capture those falling in the first category, but would incur the same obligations of assistance and return in regards to those pertaining to the second one. In terms of legitimate military targets, the article established that dual-use satellites can be the object of an attack during hostilities as long as they perform military functions contributing to the conflict. Nevertheless, caution must be paid as to the civilian casualties that might ensue as well as to the nefarious effects such an attack might have on the environment, both terrestrial and extra-terrestrial. This last issue is discussed in the final part of the paper.

While the present paper does not aim to be an exhaustive interpretation of the international law rules pertaining to armed conflict in the context of outer space warfare, it can provide a starting point for further considerations on the matter. Considering the aggressive stance of states in outer space and the increased militarization of this environment, the possibility of a conflict unfolding extra-terrestrially should not be disregarded. Therefore, it is necessary to have clarity as to the applicability of international legal norms in order to avoid impunity and offer victim states a proper framework to act in self-defence. Moreover, the actual conduct of hostilities should also be adequately regulated, thus the discussion on international humanitarian law also bears an essential importance.

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