

From non-aggressive military activities in Outer Space to ‘Space wars’

Insights into the lawfulness of non-aggressive military activities in Outer Space, the applicability of the Law of Armed Conflict in the Outer Space context and State responsibility and individual criminal liability for environmental damage in Outer Space

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Since the launch of Sputnik in October 1957 Space became domain to exploration, commercial and military activities. The development of satellite technology in particular enabled the facilitation of enhanced public services such as telecommunication, weather forecasting, Global Positioning Systems (GPS) and imagery, as well as the utilisation of these highly advanced services for security and military purposes including the facilitation of on-ground warfare. The growing reliance on Space assets for military purposes and the need to protect these assets led to an increase in both the militarisation and weaponisation of Space and a new Space race as well as to speculations on the potential for armed conflict in Space and with it to the question whether military activities in Outer Space are sufficiently regulated. Currently, there is a strong focus on the question whether International Humanitarian Law, considered the *lex specialis* of armed conflict, is applicable in the Outer Space context and if so to what extent and on the clarification of the interaction between IHL and Space Law. The first three parts of the article consider whether the threat of Space conflicts is real and whether the militarisation and weaponisation of Outer Space are lawful. The fourth and fifth parts of the article take a particular interest in the environmental aspect of Space conflicts and engage with the question whether the relevant rules and principles relevant to the protection of the environment are applicable in Outer Space and if so whether the Law of Armed Conflict can operate effectively in that context. The remainder of the article considers the issue of responsibility for environmental damage and the potential applicability of Article 8(2)(b)(iv) of the Rome Statute of the International Criminal Court to Space conflicts. Article 8(2)(b)(iv) of the Rome Statute classifies the Intentionally launching an attack in the knowledge that such attack will cause incidental loss of life or injury to civilians or damage to civilian objects, or widespread, long-term and severe damage to the natural environment that would be clearly excessive in relation to the concrete and direct overall military advantage anticipated, a war crime. Conceptually, since currently International Law does not impose criminal liability for environmental damage on States and under the principles of State responsibility States are only liable to make reparations, individual criminal liability of those responsible for the commission of war crimes is considered conducive to the enforcement of the law. Considering the potential ferocity of Space-orientated weaponry and its potential effect on both the terrestrial and Space environments, this aspect ought to be explored.

Keywords: Outer Space, military activities, weaponisation, Satellites, ASAT, Space debris, environmental protection, Space Law, Outer Space Treaty, IHL, peaceful purposes, State Responsibility, Rome Statute, Article 8(2)(b)(iv)

If there is one general rule which can be deducted from the Balkan conflict and that of Operation Desert Storm, it is the following: ground superiority is contingent upon air superiority and that air superiority is now contingent upon space superiority.

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Introduction

Since the launch of Sputnik on 4th October 1957 Space became domain to exploration, commercial and military activities with some seventy States, commercial entities and organisations currently operating in Outer Space.³ The development of Space technologies and in particular satellite technology made significant contributions to the provision of enhanced services such as weather forecasting, communication, Global Positioning Systems (GPS) and imagery. In 2018, there were over 1,800 active satellites in orbit.⁴ Nevertheless, while the development of these new Space technologies enables the facilitation of these high-tech services, at a lower cost⁵, the utilisation of these services for military purposes including the facilitation of on-ground warfare also raises concerns regarding the potential for warfare in, from, to and through Space.

Current military uses of Outer Space mainly focus on the deployment of military and dual use satellites that facilitate on-ground warfare⁶ (generally intelligence, communications and navigation) and on the development of defensive capabilities such as ground-based missile defence, anti-ballistic missiles and long-range weapons.⁷ Nevertheless, while current uses by the main Space active States being the US, Russia and China mainly focus on furthering on-ground warfare and on Space asset security rather than on offensive capabilities, the number of Space assets and military the capabilities of these States has substantially developed during the Space race particularly in the fields of intelligence, surveillance, communications, command and control and reconnaissance.⁸ China and Russia are also currently developing means to counteract US supremacy in Outer Space.⁹ The number of participants in the Space race is also increasing. Emerging participants are the members of NATO, Japan, New Zealand, and Australia as well as India (which is now the fourth State to have tested an anti-satellite (ASAT) weapon¹⁰), Iran, and Israel.¹¹

The prospect of warfare in, to, from and through Outer Space prompts the questions whether the militarisation, weaponisation and the use of Space to further on-ground warfare are lawful and whether military activities in Outer Space are sufficiently regulated should Space conflicts ensue. This article aims to address these questions. The first part of the article will discuss the meaning of the term 'Space conflicts' in the context of the militarisation and weaponisation of Outer Space. The second part of the article will highlight the underlying principles of the legal framework regulating human activities in Outer Space. The third part of the article will examine whether military activities in and the weaponisation of Outer Space are permissible under the current legal regime. The fourth and fifth parts of the article will consider the question whether International Humanitarian Law is applicable in the context of Space conflicts and if so whether the Law of

³ Matthew T. King and Laurie R. Blank, 'Symposium on the New Space Race International Law and Security in Outer: Now and Tomorrow' (2019) 113 AJIL 125

⁴ United States of America Defense Intelligence Agency, 'Challenges to Security in Space' (2019, United States of America Defense Intelligence Agency) 7.

⁵ Sergio Marchisio, 'The final frontier: Prospects for arms control in outer space' (2019, European Leadership Network) 1.

⁶ Dale Stephens, 'The International Legal Implications of Military Space Operations: Examining the Interplay between International Humanitarian Law and Outer Space Legal Regime' (2018) 94 Int'l L. Stud 75, 76

⁷ Bill Boothby, 'Space Weapons and the Law' (2017) 93 Int'l L. Stud 179, 181.

⁸ Matthew T. King and Laurie R. Blank, 'Symposium on the New Space Race International Law and Security in Outer: Now and Tomorrow' (2019) 113 AJIL 125, 127.

⁹ United States of America Defense Intelligence Agency, 'Challenges to Security in Space' (2019, United States of America Defense Intelligence Agency) 7.

¹⁰ Sergio Marchisio, 'The final frontier: Prospects for arms control in outer space' (2019, European Leadership Network) 1.

¹¹ Matthew T. King and Laurie R. Blank, 'Symposium on the New Space Race International Law and Security in Outer: Now and Tomorrow' (2019) 113 AJIL 126.

Armed Conflict can operate effectively in that context. This article takes a particular interest in the environmental consequences of Space conflicts and accordingly the focus of discussion in these two parts is on the rules relevant to the protection of the environment. The last part of the article will engage with the issue of responsibility for environmental damage in the context of Space conflicts and the question whether Article 8(2)(b)(iv) can be effectively applied in that context.

Is the risk of 'Space wars' real?

There are four possible types of armed conflicts that could fall within the ambit of the term Space conflicts. The first are Earth to Space armed conflicts where attacks on Space assets are launched from Earth, the second are Space to Earth armed conflicts where attacks against targets located on Earth are launched from Space, the third are Space to Space armed conflicts where the armed conflicts occur in Outer Space and the fourth are Space-transit Earth to Earth armed conflicts, where weapons launched from Earth travel through Space on their way to their targets, which are also located on Earth.

Earth to Space armed conflicts

Space assets could be attacked from the ground, with the most vulnerable to attack being Satellites that are located in low orbit.¹² Unique to Space is the freedom of movement free of territorial rights¹³, which means that Space at large could be utilised for exploratory, commercial and subject to limitations military activities (including Earth observation from low orbit). The location and trajectory of a satellite can be easily determined since they depend on the orbit of the satellite and its altitude.¹⁴ The orbit of a satellite does not depend on its own mass and all objects with the same velocity in the same location follow the same orbit.¹⁵ Attacks on satellites can range from 'soft kill' to 'hard kill' and include: electronic interference with the communication systems of a satellite (jamming and spoofing), cyber-attacks, directed energy attacks such as laser interference with the satellite's imaging sensors or high-power microwave interference with electrical components, laser heating of the satellite and collision with other objects (for example, in-orbit anti-satellite systems or on-ground based kinetic anti-satellite (ASAT) missiles and nuclear explosions).¹⁶ The likely environmental consequences of conflicts in or directed at the Space are damage to the Space environment itself as well as damage to the terrestrial environment. Damage caused to satellites by soft-kill methods, such as electronic interference, could lead to the malfunction of the Satellite and increase the risk of collisions with other Space objects. Following the collision between the U.S. Iridium 33 with the Russian Cosmos 2251 on 10 February 2009, for example, the U.S. Space

¹² Luca del Monte, 'Understanding the Physics of Space Security' (Bruges Colloquium Technological Challenges for the Humanitarian Legal Framework, Bruges, October 2010) 84.

¹³ Treaty on Principles Governing the Activities of State in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 610 U.N.T.S. 205, (entered into force on 10 October 1967) (hereinafter Outer Space Treaty or OST), Articles I and II; Article I of the OST provides that Outer Space shall be the province of all mankind, that Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies. Article II of the OST provides that Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.

¹⁴ Luca del Monte, 'Understanding the Physics of Space Security' (Bruges Colloquium Technological Challenges for the Humanitarian Legal Framework, Bruges, October 2010) 83.

¹⁵ Luca del Monte, 'Understanding the Physics of Space Security' (Bruges Colloquium Technological Challenges for the Humanitarian Legal Framework, Bruges, October 2010) 83.

¹⁶ Luca del Monte, 'Understanding the Physics of Space Security' (Bruges Colloquium Technological Challenges for the Humanitarian Legal Framework, Bruges, October 2010) 85; Sergio Marchisio, 'The final frontier: Prospects for arms control in outer space' (2019, European Leadership Network) 2.

Surveillance Network tracked some 1800 new debris in the orbital planes of the two satellites.¹⁷ A damaged Satellite can stay in orbit for up to hundreds of years.¹⁸ The destruction of space assets (hard-kill), which is a likely consequence of conflicts in Space, could lead to a spread of debris and Nuclear power sources in an area of over several hundred square meters.¹⁹ The number of fragments floating in space could be quite comprehensive as was demonstrated by China's destruction of its own Fengyun-1C weather satellite using a ballistic missile on 11 January 2007, which resulted in some 900 fragments measured 4 inches or larger and thousands of smaller fragments.²⁰ An additional risk is that Space debris may fall onto Earth as was demonstrated by the Cosmos 954 incident on 24 January 1978, when the Cosmos 954 entered the atmosphere into Canadian airspace North of the Queen Charlotte Island and debris fell onto Canadian territory including parts of the Northwest Territories, Alberta and Saskatchewan.²¹ Efforts to mitigate peacetime Space debris have been reported, for example, the planning of the Clear Space-1 mission with tests scheduled to begin in 2020 and official launch in 2025, which entails the launch of a robot developed by Swiss startup ClearSpace designed to remove an European Space Agency (ESA) rocket that was left in Space in 2013 and self-destruct with the rocket in the atmosphere, Japans' development of satellite that uses magnets to catch and destroy debris and the UK's experimental device to capture satellites with a net.²² A main obstacle to these efforts, however, is funding.²³

Space to Earth armed conflicts

Space to Earth armed conflicts are armed conflicts that originate in Outer Space and are targeted at Earth. Are 'wars' from above likely to occur? They already have. The first armed conflict to have been dubbed a Space war is the 1991 Gulf War, which was dubbed a Space war due to the Coalition's material reliance on Global positioning Satellites (GPS) during Operation Desert Storm (with some 60 Satellites used²⁴).²⁵ The dubbing of the Gulf War as the first Space war suggests that no ultra-military operations such as could be seen in movies (for example, missile showers or laser beam attacks) are required (although a possibility of the future²⁶) and that material reliance on services provided by Space assets that facilitate armed conflict in the terrestrial environment is sufficient to consider an armed conflict a 'Space war'. Unless the exact same laws that govern armed conflicts on Earth would be considered applicable in Space as well, determining the exact threshold of material reliance that separates terrestrial from Space conflicts may become a point of difficulty in the future. The exact area that constitutes 'Outer Space' is also not formally defined

¹⁷ J Nicholas 'The Collision of Iridium 33 and Cosmos 2251: The Shape of Things to Come' (60th International Astronautical Congress Daejeon Republic of Korea, 2009, National Aeronautics and Space Administration)

¹⁸ Anna Hurova, 'Protection of Space Environment in the light go the perspective challenges of "Space Wars"' (2018) 5(2) JPNU 107, 112.

¹⁹ Anna Hurova, 'Protection of Space Environment in the light go the perspective challenges of "Space Wars"' (2018) 5(2) JPNU 107, 112.

²⁰ Shirley Kan, 'China's Anti-Satellite Weapon Test' (CRS Report for Congress Order Code RS22652, 2007, Federation of American Scientists) CRS-2.

²¹ Alexander F. Cohen, 'Cosmos 954 and the International Law of Satellite Accidents' (1984) 10(1) YJIL 78, 79.

²² Jessie Young, 'Europe is sending a robot to clean up space. Why is the junk there in the first place?' *CNN Business* (Hong Kong, 12 December 2019) <<https://edition.cnn.com/2019/12/12/tech/space-junk-robot-esa-intl-hnk-scli-scn/index.html>> accessed 16 December 2019

Jessie Young, 'Europe is sending a robot to clean up space. Why is the junk there in the first place?' *CNN Business* (Hong Kong, 12 December 2019) <<https://edition.cnn.com/2019/12/12/tech/space-junk-robot-esa-intl-hnk-scli-scn/index.html>> accessed 16 December 2019

²⁴ Robert A. Ramey, 'Armed Conflict on the Final Frontier: the Law of War in Space' (2000) 48 A. F. L Rev, 1, 122.

²⁵ Dale Stephens 'Law and War in Outer Space' (Research Paper No. 18-03, 2018, Adelaide University Research Unit on Military Law and Ethics) 32.

²⁶ *Available technology places important limits on what systems are currently feasible for a given country, but those limits can change over time and do not represent fundamental limitations. The space-based laser, for example, has so far achieved power levels well below what is required for a usable weapon, but there do not appear to be fundamental limits to increasing its power over time*, Luca del Monte, 83.

and may present additional difficulties if Space conflicts and terrestrial conflicts are to be governed by different sets of rules. It is generally accepted that Outer Space commences at the altitude of 100 kilometres above sea level, a delimitation based on Customary Law.²⁷ Differentiation between Space conflicts and terrestrial conflicts could be achieved by either formally delimiting Outer Space geographically or alternatively by the classification of the type asset/weapon used, being either aircraft or a Space asset. Other Space-technology facilitated armed conflicts outside the 1991 Gulf War include NATO's operations in Yugoslavia in 1999, which are said to have been even more heavily supported by Space assets than the 1991 Gulf War²⁸, the 2001 Coalition military actions in Afghanistan and the invasion of Iraq in 2003.²⁹ In environmental terms, the use of Space technology to support the implementation of military operations in the terrestrial environment means that the environmental damage caused by armed conflicts is likely to increase. While the use of Space technology is likely to enhance precision and hence potentially reduce the level of collateral damage caused, it also enables military operations that otherwise may have not been possible, for example, navigation through clouds of smoke (such as occurred during the Gulf War).

Space to Space armed conflicts

Thus far, there have been no known incidents of use of force by one State against another in Outer Space.³⁰ Are Space to Space armed conflicts likely to happen in the future? In the words of Freeland:

Unfortunately, present indications suggest that there is an increasing likelihood that outer space will not only be used to facilitate armed conflict (as it already is) but might ultimately be a theatre of war, despite the efforts of the international community. The proliferation of military space assets means that, from a strategic viewpoint, the disabling or destruction of satellites used by another country may be perceived as giving rise to very significant advantages. The fact that it has not happened in the past is no reason to assume that we will never see a space conflict.³¹

Space-transit Earth to Earth armed conflicts

Space-transit Earth to Earth armed conflicts refer to military operations that originate from Earth and are conducted through Space, for example, the launch of a long-range inter-continental ballistic missile (ICBM) that travels through Space prior to arriving at its target which is also located on Earth.³² A main benefit of Space-transit is that the transit of a weapon through Space avoids territorial air space. One of the challenges relating to the operation of the Law of Armed Conflict in the context of Space-transit Earth to Earth conflicts is that since (in accordance with common

²⁷ M. P. Ferreira-Snyman, 'Selected Legal Challenges Relating to the Military Use of Outer Space, with Specific Reference to Article IV of the Outer Space Treaty' (2015) 18 (3) Potchefstroom Electronic Law Journal <http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S1727-37812015000300003> accessed 25 September 2019

²⁸ Robert A. Ramey, 'Armed Conflict on the Final Frontier: the Law of War in Space' (2000) 48 A. F. L Rev, 1,122.

²⁹ Stephen Freeland, 'Legal Regulation of the Military Use of Outer space - What Role for International Humanitarian Law?' (Bruges Colloquium Technological Challenges for the Humanitarian Legal Framework, Bruges, October 2010) 93

³⁰ Stephen Freeland, 'Peaceful Purposes? Governing the Military Uses of Outer Space' (Research Paper No. 03/2017 Legal Studies Research Paper Series, 2015, Western Sydney University School of Law) 49.

³¹ Stephen Freeland, 'Peaceful Purposes? Governing the Military Uses of Outer Space' (Research Paper No. 03/2017 Legal Studies Research Paper Series, 2015, Western Sydney University School of Law) 49.

³² Kubo Mačák, 'Silent War: Applicability of the *Jus in Bello* to Military Space Operations' (2018), Exeter Centre for International Law Working Paper Series 2018/1, 7 <<https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1717&context=ils>> accessed 20 September 2019

Article 2 of the Geneva Conventions³³) the Law of Armed Conflict becomes applicable only when armed conflict already exists, if the Law of Armed Conflict (or aspects thereof) is determined applicable in the Outer Space context it would be necessary to establish the exact time when hostilities commenced. In difference to terrestrial conflicts where weapons take a relatively short time to reach their targets, the determination of when an armed conflict begins is more difficult for armed conflicts involving both the Space and Earth zones, which include not only Space-transit Earth to Earth armed conflicts but also armed conflicts from to and Space. A Space-transit ICBM, for example, takes about thirty minutes to reach its target.³⁴ Determining the exact time when an armed conflict begins would be even more difficult in the context of Earth to Space and Space to Earth conflicts since an Earth to Space kinetic ASAT weapons, for example, can take several hours to reach a Satellite that is orbiting in the Geosynchronous Orbit (about 36,000 kilometres above mean sea level).³⁵ It has been suggested that this problem can be resolved by reference to common Article 2 of the Geneva Conventions, which defines an international armed conflict as any armed conflict which may arise between two or more States.³⁶ A focus on the word ‘arise’ would mean that the armed conflict commences at the time of launch. Another aspect of Space-transit Earth to Earth conflicts is the potential interception of missiles during the boost phase or in mid-course, which can be executed by kinetic, laser or potentially by cyber means.³⁷ The destruction of or interference with missiles while in transit present the question whether the attack would then be classified a Space-transit or a terrestrial conflict depending on the location of the point of interception or whether the conflict would be still classified a (failed) Space orientated conflict in a accordance with its designated purpose at the time of launch.

Are the militarisation and weaponisation of Outer Space lawful?

The legal framework regulating activities in Outer Space (hard law) consists of five core treaties: the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (the Outer Space Treaty or OST)³⁸, which is the main treaty regulating human activities in Outer Space³⁹, the 1968 Agreement on the Rescue of Astronauts and the Return of Objects Launched in Outer Space (the Rescue convention)⁴⁰, the 1972 Convention on International Liability for Damage Caused by Space Objects (the liability Convention)⁴¹, the 1975 Convention on Registration of Objects Launched into Outer

³³ Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, Aug. 12, 1949, 75 U.N.T.S. 31 (Geneva Convention I); Convention for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea, Aug. 12, 1949, 75 U.N.T.S. 85 (Geneva Convention II); Convention Relative to the Treatment of Prisoners of War, Aug. 12, 1949, 75 U.N.T.S. 135 (Geneva Convention III); Convention Relative to the Protection of Civilian Persons in Time of War, Aug. 12, 1949, 75 U.N.T.S. 287 (Geneva Convention IV).

³⁴ Kubo Mačák, 'Silent War: Applicability of the *Jus in Bello* to Military Space Operations' (2018), Exeter Centre for International Law Working Paper Series 2018/1, 32 <<https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1717&context=ils>> accessed 20 September 2019

³⁵ Kubo Mačák, 'Silent War: Applicability of the *Jus in Bello* to Military Space Operations' (2018), Exeter Centre for International Law Working Paper Series 2018/1, 32 <<https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1717&context=ils>> accessed 20 September 2019

³⁶ Kubo Mačák, 'Silent War: Applicability of the *Jus in Bello* to Military Space Operations' (2018), Exeter Centre for International Law Working Paper Series 2018/1, 32 <<https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1717&context=ils>> accessed 20 September 2019

³⁷ Bill Boothby, 'Space Weapons and the Law' (2017) 93 Int'l L. Stud 179, 183.

³⁸ Outer Space Treaty.

³⁹ Dale Stephens, 'The International Legal Implications of Military Space Operations: Examining the Interplay between International Humanitarian Law and Outer Space Legal Regime' (2018) 94 Int'l L. Stud 75, 86.

⁴⁰ Agreement on the Rescue of Astronauts and the Return of Objects Launched in Outer Space, Apr. 22, 1968, 672 U.N.T.S. 119 (hereinafter Rescue convention).

⁴¹ Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 961 U.N.T.S. 187 (hereinafter Liability Convention).

Space (the Registration Convention)⁴² and the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (The Moon Agreement)⁴³. A sixth treaty that is relevant in the context of Outer space is the Limited Test Ban Treaty⁴⁴, which prohibits Nuclear weapons tests in the Atmosphere, in Outer Space and Underwater.⁴⁵ The legal regime regulating human activities in Outer Space (hard law) is founded on the principles of peaceful use, common interest, freedom, co-operation, mutual assistance, no appropriation and non-intervention, which leads to the question whether current military activities in Outer Space (including its weaponisation) are lawful. The preamble to the OST recognises the common interest of all mankind in the progress of the exploration and use of Outer Space for peaceful purposes. The principle of ‘peaceful purposes’ is also codified in Article IV of the OST: *The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes.* Article I of the OST provides that the exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries and shall be the Province of all mankind and that Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind. Article II of the OST provides that Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by either claim of sovereignty, means of use or occupation, or by any other means. Article V also provides that astronauts shall be regarded as envoys of mankind in Outer Space. Article IX of the OST provides that State Parties to the OST shall be guided by the principles of co-operation and mutual assistance in the exploration and use of Outer Space and conduct all their activities with due regard to the corresponding interests of all other State parties. The due regard to the corresponding interest of all other State Parties requirement in Article IX further reinforces the non-appropriation principle. Article IX also imposes the obligation that a State must take appropriate international consultation if that State party has reason to believe that an activity or experiment planned by it or by its nationals would cause potentially harmful interference with the activities of other States in the peaceful exploration and use of Outer Space, which also reflects the non-intervention principle.

Are military activities in Outer Space consistent with the principle of peaceful use?

An uncertainty arising from the OST is that the OST does not define the term ‘peaceful purposes’, which leads to the question whether ‘peaceful purposes’ mean no military activity whatsoever or merely no aggression. If the term ‘peaceful purposes’ in Article IV of the OST is interpreted to mean ‘no aggression’, then the non-aggressive military use of Space could be (and as demonstrated is) considered permissible. What State practice proved thus far is that it is now generally accepted that the term ‘peaceful purposes’ is interpreted to mean ‘no aggression’ and that certain military activities in Space are permissible.⁴⁶ Considering that in accordance with Article 31(3)(b) of the

⁴² Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 1023 U.N.T.S. 15 (hereinafter Registration Convention)

⁴³ Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 18, 1979, 1363 U.N.T.S. 3 (hereinafter Moon Agreement)

⁴⁴ Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer space and Underwater, Aug. 5, 1963, 480 U.N.T.S. 43, entered into force Oct. 10, 1963 (hereinafter Limited Test Ban Treaty).

⁴⁵ Limited Test Ban Treaty, Article I(1).

⁴⁶ Dale Stephens and Cassandra Steer, ‘Conflicts in Space: International Humanitarian Law and its application to Space Warfare’ (2015) *XL Annals of Air and Space Law* 1, 3; Freeland argues that the debate whether ‘peaceful purposes’ means no military activity or non aggression is redundant since the militarisation of space is already a given: *While there is general agreement – but not complete unanimity – among space law commentators that this is directed against ‘non-military’ rather than merely ‘non-aggressive’ activities, the reality has, unfortunately, been different. It is undeniable that, in addition to the many commercial, civilian and scientific uses, outer space has and continues to be used for an expanding array of military activities. Unless concrete steps are taken to arrest this trend – which will require a significant shift in political will, particularly among the major powers – it is likely that space will increasingly be utilized to further the military and strategic aims of specific countries, particularly as military and space technology continues to evolve and develop.*, Stephen Freeland, ‘Peaceful Purposes? Governing the Military Uses of Outer Space’

Vienna Convention on the Law of Treaties⁴⁷ consequent practice by States is one of the factors that can be taken into account in the interpretation of a treaty, the interpretation of the term as ‘non-aggressive’ military use could be argued lawful as well as continue to be influenced by State practice.⁴⁸

Does the Outer Space Treaty itself support the current interpretation of Peaceful use? Article III of the Outer Space Treaty imposes the obligation that states shall carry on activities in the exploration and use of Outer Space in accordance with International Law, including the Charter of the United Nations⁴⁹, in the interest of maintaining international peace and security and promoting international co-operation and understanding. There are two points of view as to whether the Outer Space Treaty permits military activities. The first view is that Article III of the OST contemplates peaceful uses only as demonstrated by the specific reference to the Charter of the United Nations, which is strengthened by the prohibitions imposed by Article IV of the OST.⁵⁰ Article 2(4) of the Charter of the United Nations reads as follows: *all members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the purposes of the United Nations*. Article 2(4) reflects the principal tenet of the United Nations to maintain international peace and security.⁵¹ Article IV of the OST prohibits the placing of Nuclear weapons or any other weapons of mass destruction in Outer Space and the establishment of military bases, installations and fortifications, the testing of any kind of weapons and the conduct of military manoeuvres on the Moon and other celestial bodies. The second point of view is that although on its own Article III may suggest that the intention of the Outer Space Treaty was that Space will be used for peaceful purposes only, when combined with Article IV, Article III could be interpreted to have contemplated that military activity that is consistent with the UN Charter and other International Law (that is, non-aggressive activities that do not involve the threat or use of force) are permissible as long as they do not breach the limitations that are imposed by Article IV of the OST.⁵²

Is the weaponisation of Outer Space in breach of the OST?

Article IV of the Outer Space Treaty imposes only two prohibitions. The first is on the placing of Nuclear weapons or any other weapons of mass destruction in Outer Space and the second is establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on the moon and other celestial bodies. The prohibition on the placing of nuclear/weapons of mass destruction in outer Space reads as follows:

*States Parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.*⁵³

(Research Paper No. 03/2017 Legal Studies Research Paper Series, 2015, Western Sydney University School of Law) 45.

⁴⁷ Vienna Convention on the Law of Treaties, May 23, 1969, 1155 U.N.T.S. 331.

⁴⁸ Stephen Freeland, ‘Peaceful Purposes? Governing the Military Uses of Outer Space’ (Research Paper No. 03/2017 Legal Studies Research Paper Series, 2015, Western Sydney University School of Law) 45.

⁴⁹ Charter of the United Nations, entered into force 24 October, 1945, as amended by A/Res/1991 (XVIII) 17 December, 1963, entered into force 31 August, 1965, 557 U.N.T.S. 143, entered into force 12 June 1968, 638 U.N.T.S. 308 and 2847 (XXVI) of 20 December, 1971, entered into force 24 September, 1973, 892 U.N.O.TS 119. (hereinafter Charter of the United Nations)

⁵⁰ Stephen Freeland, ‘Peaceful Purposes? Governing the Military Uses of Outer Space’ (Research Paper No. 03/2017 Legal Studies Research Paper Series, 2015, Western Sydney University School of Law) 44-45.

⁵¹ Charter of the United Nations, Article 1.

⁵² Dale Stephens, ‘The International Legal Implications of Military Space Operations: Examining the Interplay between International Humanitarian Law and Outer Space Legal Regime’ (2018) 94 Int’l L. Stud 75, 80.

⁵³ Outer Space Treaty, Article IV.

Technically, this means that the provision does not prohibit the deployment of conventional weapons⁵⁴, conventional weapons powered by a Nuclear source, not being weapons of mass destruction⁵⁵ and the entry into Space of IBCMs, weapons of mass destruction and Nuclear weapons that transit through Space since they do not complete a full orbit.⁵⁶ The precise wording of the prohibition on the establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on the moon and other celestial bodies is as follows:

*The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited.*⁵⁷

The prohibition, therefore, is limited to the Moon and other celestial bodies but not to the Space in between. The term ‘exclusively for peaceful purposes’ is also limited to the Moon and other celestial bodies, which could be interpreted to mean that military activities in the Space around the Moon and other celestial bodies are permissible. The prohibition for the Moon and other celestial bodies is also limited to: the establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres. Military activities outside those specified are not prohibited.

Is the Law of Armed Conflict applicable in Outer Space?

Considering the increase in the militarisation and weaponisation of Outer Space and the prospect of armed conflict to, from and in Space there is strong merit in considering whether IHL, considered the *lex specialis* of armed conflicts, is applicable in the Outer Space context. Article III of the OST provides that State parties to the OST shall carry on activities in the exploration and use of Outer Space, including the Moon and other celestial bodies, in accordance with international law, including the *Charter of the United Nations*. The applicability of International Law in general presents no legal issue, since as a matter of Law, International Law is the body of law that governs interactions between States and hence can be taken to apply in all environments involving interactions between States including Outer Space.⁵⁸ The applicability of International Law is also confirmed in Article III of the Outer Space Treaty, which provides that activities in and the use of Outer Space shall be conducted in accordance with International Law. Whether the OST invites the applicability of IHL in particular, however, is a more debated question. It has been argued that while Article III of the OST invites International Law it also makes specific reference to the Charter of the United Nations and that since *jus ad bellum* and *jus in bello* are generally understood to operate autonomously from each other, Article III of the OST can be reasonably interpreted to extend to *jus ad bellum* but not to *jus in bello*.⁵⁹ An opposing argument proposes that since Article III of the Outer Space Treaty provides that all activities in Outer Space shall be conducted in

⁵⁴ Bill Boothby, ‘Space Weapons and the Law’ (2017) 93 Int’l L. Stud 179, 202.

⁵⁵ Bill Boothby, ‘Space Weapons and the Law’ (2017) 93 Int’l L. Stud 179, 202.

⁵⁶ Bill Boothby, ‘Space Weapons and the Law’ (2017) 93 Int’l L. Stud 179, 203.

⁵⁷ Outer Space Treaty, Article IV.

⁵⁸ Matthew T. King and Laurie R. Blank, ‘Symposium on the New Space Race International Law and Security in Outer: Now and Tomorrow’ (2019) 113 AJIL 127.

⁵⁹ Kubo Mačák, ‘Silent War: Applicability of the *Jus in Bello* to Military Space Operations’ (2018), Exeter Centre for International Law Working Paper Series 2018/1, 14 <<https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1717&context=ils>> accessed 20 September 2019

accordance with International Law and IHL is part of International Law, then IHL is applicable.⁶⁰ If one takes the approach that what is not expressly excluded is not necessarily precluded, then the logical conclusion would be that since Article III does not expressly exclude the applicability of any specific body of International Law, conceptually, all relevant International Law (including IHL) could be considered applicable.

State practice as a determinant factor

If Space-technology-supported terrestrial warfare proved anything outside its superiority, it is that the Law of Armed Conflict is applicable at least to this aspect of Space to Earth conflicts. The use of Space technology to support terrestrial warfare on several occasions (including by NATO) suggests that it is accepted that the OST does not apply/extend to terrestrial warfare even when supported by the use of Space and that it is accepted that IHL is the governing law for conflicts of the sort (as was the case during these conflicts). This means that, if interpreted by extension, the use of Space weaponry to further terrestrial warfare would also be governed by IHL. Future possibilities could extend to kinetic attacks on selected Space-asset infrastructure located on Earth and even to general direct kinetic attacks on States. There would be a certain bias in considering IHL applicable to the use of Space weapons to further kinetic attacks on Earth but not independent direct kinetic attacks. The fact that the impacts of Space to Earth conflicts (whether direct or Space-technology facilitated) affect the terrestrial environment also supports that the prevailing law should be the law of the land. Unless one is willing to accept that International Law that governs Earth is an Earth 'domestic Law' that limits itself to land, sea and air and that Space Law is limited to damage in the Space environment alone but could and is interpreted so to permit attacks on Earth (at least in the way of Space-technology facilitated warfare), then terrestrial law should be interpreted as extending to other spaces being the source of attack (including Outer Space and, for that matter, Cyber Space). An attack on infrastructure located in the terrestrial environment or an attack on a State is also an attack by one State against another disregard where the weapons are launched from and therefore should be governed by the Law of Armed Conflict. Space-transit Earth to Earth operations originate from and conclude on Earth and therefore present no substantial issue in the determination of the applicable law. Since Article IV of the OST does not prohibit partial-orbit, the OST does not engage with this situation and there is no conflict of law. Discussed earlier, the legal issue that could arise in this case would be the determination of whether the attack originates from the geographical location of the launch being Earth or the location of the mechanism that controls the missile, where the missile is controlled by a Space asset. If the attack is considered to have originated in Space, then the attack would be classified as a Space to Earth conflict, which as discussed before affects Earth and therefore should be interpreted to be governed by terrestrial law. Since Earth to Space conflicts originate on Earth and can be considered as attacks on areas under control or on property and since Space Law does not extend to Earth as evident by the utilisation of Space assets to further on-ground conflicts, providing that the attack meets the threshold for the level of use of force required to render the attack an armed conflict, it would be reasonable to conclude that the prevailing law is terrestrial law. The only scenarios that questions the applicability of IHL, therefore, are Space to Space conflicts.

Which IHL rules and principles could be considered applicable during Space to Space conflicts?

If one accepts that the applicability of IHL is not precluded, then the question becomes which IHL rules and principles can be considered relevant and hence applicable in the event of Space to Space conflicts. The most logical approach would be that providing that the military activities involved satisfy the level of force required to render the activities an international armed conflict, unless a

⁶⁰ Stephen Freeland, 'Peaceful Purposes? Governing the Military Uses of Outer Space' (Research Paper No. 03/2017 Legal Studies Research Paper Series, 2015, Western Sydney University School of Law) 49.

particular provision or principle is expressly excluded, IHL in its entirety should in as far as possible be considered applicable (although not without challenges) and should be implemented if and as each rule or principle becomes relevant. Some IHL rules, for example, the Law of occupation, may not seem relevant at the moment, however, there is no knowing how the means and methods of Space warfare may develop in the future, or for that matter, what the future uses of Outer Space may be (including the possibility of human settlement). Considering the current interpretation of the term ‘peaceful use’ as non-aggressive, there is no knowing what the ‘no appropriation’ principle for example or the prohibition on the establishment of military bases, installations and fortifications on celestial bodies may be interpreted to mean in the future.⁶¹ The focus, therefore, should be not so much on determining which rules are applicable either now or at a specific point in time in the future, but rather on clarifying how international law (including Space Law and IHL) operate in the context of Outer Space and on addressing any difficulties that may arise from the mutual application of Space Law and IHL. If, however, one had to argue the applicability of IHL relevant to the protection of the environment during Space to Space conflicts, support for the applicability of some of the main instruments and Customary principles could be derived from within the treaties themselves, the OST and the general principles of International Law.

The main treaty *jus in bello* relevant to the protection of the environment are the Hague Convention IV and its Hague Regulations⁶², the 1949 Geneva Convention IV and Additional Protocol I to the 1949 Geneva Conventions⁶³. Additional Protocol I embodies two out of the three provisions that afford protection to the environment in its own right. The first is Article 35(3), which prohibits the use of means and methods of warfare that are intended or may be expected to cause widespread, long-term and severe damage to the environment. Article 55 of Additional Protocol I, which is the second provision, imposes *inter alia* a duty of care to protect the natural environment against widespread, long-term and severe damage⁶⁴ as well as prohibits attacks on the environment by way of reprisals.⁶⁵ Considering that armed conflict is likely to increase the number of Space debris and other forms of pollution it is likely to attract the applicability of the environmental provisions. In the minimum, it could be argued that since Article 35(3) is purely eco-centric and deals with the protection of the environment *per se* and does not entertain the contingencies of war (for example, military necessity) or any other anthropocentric considerations and the obligations imposed by the provision are owed to the environment itself, the applicability of Article 35(3) is not limited to the terrestrial environment and extends to Outer Space.⁶⁶ The second instrument to offer direct protection is ENMOD⁶⁷, which prohibits the use of environmental modification techniques having widespread, long-lasting or severe effects as means of destruction, damage or injury to another State party.⁶⁸ Environmental modification techniques refer to: *any technique for changing - through the deliberate manipulation of natural processes - the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space.*⁶⁹ While as

⁶¹ State practice by a limited number of States could be argued not to have reached the threshold of Customary International Law.

⁶² Convention Respecting the Laws and Customs of War on Land and its annex Regulations concerning the Laws and Customs of War on Land, 18 October 1907, 36 Stat. 2277, 1 Bevans 631, 205 Consol. T.S. 277, 3 Martens Nouveau Recueil (ser. 3) 461, *entered into force* Jan. 26, 1910 (hereinafter Hague Convention IV and the Hague Regulations).

⁶³ Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts, 8 June, 1977, 1125 U.N.T.S. 3 (hereinafter Additional Protocol I).

⁶⁴ Additional Protocol I, Article 55(1).

⁶⁵ Additional protocol I, Article 55(2).

⁶⁶ Dale Stephens and Cassandra Steer, ‘Conflicts in Space: International Humanitarian Law and its application to Space Warfare’ (2015) XL *Annals of Air and Space Law* 1, 9

⁶⁷ Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, Dec 10, 1976, 1108 U.N.T.S. 151 (hereinafter ENMOD).

⁶⁸ ENMOD, Article I.

⁶⁹ ENMOD, Article II.

discussed earlier, whether ENMOD will become relevant in the context of Space to Space conflicts is yet unknown, it does state its own applicability.

The Geneva Conventions also imply their applicability in the context of Outer Space. Common Article 1 to the Geneva Conventions states that the high Contracting Parties undertake to respect and to ensure respect for the conventions *in all circumstances* (emphasis added). It has been argued that the term ‘in all circumstances’ should be interpreted as extending the applicability of the Geneva conventions to any armed conflicts wherever it may occur including Space as is also supported by the applicability of the Geneva Conventions to areas beyond national jurisdiction such as the high seas.⁷⁰ The relevance and applicability of the Geneva Conventions could also be considered to extend to Space by virtue of the definitions contained within. Common Article 2 to the Geneva Conventions is the main instrument for the determination of whether an international armed conflict exists. Article IV of the OST itself may be interpreted as importing the applicability of Common Article 2 to the Geneva Conventions through the use of the term ‘peaceful purposes’, which necessitates the differentiation between armed conflict and peaceful military activities.

The Hague Law is considered Customary International Law and hence is binding on all States. The main provision for the protection of the environment is Article 23(g) of the Hague Regulations, which prohibits: the destruction or seizure of enemy property unless such destruction is imperatively demanded by the necessities of war (with destruction being the relevant term in the context of the environment). The applicability of the Hague Law in particular has been subject to debate. It has been suggested that since the focus of the Hague Convention IV (and its Regulations) is on the law and customs of war on land (as its name suggests), the convention does not demonstrate the intention that its application extends to the Sea, air and Outer Space.⁷¹ What needs to be remembered, however, is that the Hague Law is not the source of the Customary Law but rather reflects established Customary International law. It has been argued that since Customary International Law is created by *opinio juris* and State practice, unless the customary norm is established subject to specific limitations (for example, that the norm exists only in relation to particular location or event), Customary International Law that regulates the conduct of the parties to a conflict should apply to the conduct of the parties disregard of the location where the conduct occurs.⁷² The applicability of Customary International Law as a governing body in the context of armed conflicts is also supported by the Martens Clause, which is a key IHL principle. The Martens Clause provides *inter alia* that in the absence of treaty provisions, the parties to the conflict remain under the protection and rule of International Law as they arise from Customary International Law, the laws of humanity and the dictates of public conscience.⁷³ Other relevant Customary International Law are the customary principles of IHL (whether codified or not) and any other provisions that have achieved the status of Customary International Law being grave breaches of the Geneva Conventions and additional protocol I. Grave breaches of the Geneva Conventions and Additional Protocol I include: the extensive destruction and appropriation of property not justified

⁷⁰ Kubo Mačák, 'Silent War: Applicability of the *Jus in Bello* to Military Space Operations' (2018), Exeter Centre for International Law Working Paper Series 2018/1, 20 <<https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1717&context=ils>> accessed 20 September 2019

⁷¹ Kubo Mačák, 'Silent War: Applicability of the *Jus in Bello* to Military Space Operations' (2018), Exeter Centre for International Law Working Paper Series 2018/1, 20 <<https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1717&context=ils>> accessed 20 September 2019

⁷² Kubo Mačák, 'Silent War: Applicability of the *Jus in Bello* to Military Space Operations' (2018), Exeter Centre for International Law Working Paper Series 2018/1, 22 <<https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1717&context=ils>> accessed 20 September 2019

⁷³ Hague Convention IV, Preamble; Additional Protocol I, Article 1(2); Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, Apr. 10, 1981, 1342 U.N.T.S. 137 (hereinafter Conventional Weapons Convention), Preamble.

by military necessity and carried out unlawfully and wantonly⁷⁴, launching an indiscriminate attack against civilian objects in the knowledge that such attack would cause excessive damage⁷⁵, attacks against works and installations containing dangerous forces⁷⁶, making non-defended localities and demilitarised zones the object of attack⁷⁷ and subject to conditions, making clearly-recognised historic monuments, works of art or places of worship that are afforded protection by special agreement the object of attack causing extensive destruction⁷⁸. Considering that some Space assets are powered by Nuclear sources, the prohibition on attacks on certain works and installations containing hazardous forces⁷⁹ may be relevant to attacks on such space assets, however, the applicability of the prohibition is uncertain in view of the words ‘works’ and ‘installations’. Considering the current militarisation and weaponisation of Space it is unlikely that at this point in time the zone subject to human activities could be classified as non-defended or demilitarised zone in accordance with Article 59 and 60 of Additional Protocol I (although with more stringent limitations for the Moon and other celestial bodies). Article IV of the OST in itself could also be argued to import some of the rules regulating the use of certain weapons through the prohibition on the placing in orbit around Earth any objects carrying Nuclear weapons or any kind of weapons of mass destruction, the installation of such weapons on celestial bodies and the stationing of such weapons in Outer space in any other manner. The relevant conventions are the Biological Weapons Convention⁸⁰ and the Chemical Weapons convention⁸¹.⁸² The prohibition on Nuclear weapons is likely to invite the new Treaty on the Prohibition of Nuclear Weapons (TPNW)⁸³ if and when it enters into force. Article 1(g) of the TPNW imposes the obligation on States to never under any circumstances allow stationing, installation or deployment of any Nuclear weapons or other Nuclear explosive devices in its territory or at any place under their jurisdiction or control.

Is IHL suitable to govern in Outer Space?

A pressing question, and a subject of debate, is whether IHL, even if applicable, is suitable to govern in Outer Space. There are two aspects to this question. The first is whether IHL, which regulates the conduct of the parties during armed conflicts, is sufficiently compatible with the legal regime that regulates human activities in Outer Space, and, in particular, the designation of Outer Space for peaceful purposes, and the second is whether the rules and principles of the Law of Armed Conflict are sufficiently adaptable so as to effectively operate in the unique environment of Outer Space and in the context of high-tech methods and means of warfare that are likely to typify Space conflicts.

Mutual supportiveness issues

The main difficulty relating to the applicability of the Law of Armed conflict in Outer

⁷⁴ Geneva Convention I, Article 50; Geneva Convention II, Article 51; Geneva Convention IV, Article 147; Article 147 empowers Article 53 of the Geneva Convention IV, which prohibits the destruction of property where the destruction is not rendered absolutely necessary by military operations in the context of occupation.

⁷⁵ Additional Protocol I, Article 85(3)(b).

⁷⁶ Additional Protocol I, Article 85(3)(c).

⁷⁷ Additional Protocol I, Article 85(3)(d).

⁷⁸ Additional Protocol I, Articles 53 and 85(4)(d).

⁷⁹ Additional Protocol I, Article 56(1).

⁸⁰ Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons, 1972, 26 U.S.T. 583; T.I.A.S. 8062 (hereinafter Biological Weapons Convention).

⁸¹ Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on their Destruction, 1993, *reprinted in* 32 I.L.M. 804 (1993) (hereinafter Chemical Weapons Convention).

⁸² Bill Boothby, ‘Space Weapons and the Law’ (2017) 93 Int’l L. Stud 179, 203.

⁸³ Treaty on the Prohibition of Nuclear Weapons, UN Doc A/CONF.229/2017/8, opened for signature 20 September 2017, not yet in force (hereinafter TPNW); Pursuant to Article 15(1) of the TPNW the Treaty will enter into force 90 days after the fiftieth instrument of ratification, acceptance, approval or accession has been deposited.

Space is that while the legal regime governing Outer Space is founded on the principle of peaceful use, the Law of Armed Conflict does not prohibit armed conflicts, but rather, only regulates the conduct of the parties with the aim of reducing superfluous damage and unnecessary suffering⁸⁴, which could result in a situation where since IHL accommodates the contingencies of war (for example, military necessity), the accommodations made could result in inconsistencies with the principles of Space Law (for example, the principle of peaceful use). The difference between Space Law and other peacetime regimes, for example, Environmental Law, is that while Environmental Law is a body of law that prescribes rules concerning the protection of the environment, the Space Law regime actually prescribes peaceful use. This, however, does not mean that IHL should or could be excluded. Although aspects of the two regimes appear non-complementary and conflicts of law are likely to arise, the fact remains that neither Space nor Space Law exist in isolation. The best approach to tackling any conflicts of law that may arise would be to adopt the view that what is prohibited by one body of law should not be permitted by the other. For example, since Article IV Prohibits testing of weapons on the Moon and other celestial bodies, The Nuclear test Ban Treaty should be interpreted so as to include this particular prohibition. Applying the stricter rule is likely to enhance protection. It has been argued that the likelihood of new treaties being developed is slim and as a result the most likely tool to develop the law governing outer Space is Customary International Law that would result from the development of patterns of practice by States and their willingness to accept such practice as legally binding.⁸⁵ There is indeed much that will need to be determined by State practice, however, unless one is willing to accept that the faith of Space and its sustainability will be directed by security concerns, the legal framework must be fully realised, not the least through the applicability of IHL and other relevant International Law. IHL itself has not developed so as to specifically regulate technological developments such as Cyber war, autonomous weapons and Space warfare.⁸⁶ It is therefore important that manuals explaining the interaction of the relevant bodies of law in the context of Outer Space be developed. The 2013 Tallinn Manual, for example, while not legally binding, offers some strong understandings on the applicability of International Law to Cyber warfare. Unless Russia's draft Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects (PPWT) is accepted (both the 2008 draft and the 2014 revised draft submitted to the Conference on Disarmament have been rejected⁸⁷), the militarisation, weaponisation and already existing utilisation of Space technology for warfare purposes are not likely to cease. There is also a strong discomfort in the fact that while the Gulf War has been dubbed the first Space war, the use of Outer Space or more precisely the use of services provided by Space assets located in Space to support terrestrial warfare, is considered non-aggressive. The question, therefore, is not only whether IHL extends to Outer Space during armed conflicts but also whether Space Law extends to Earth during military operations that do not meet the level of force required to meet the definition of an armed conflict.

Challenges relating to the practical implementation of the rules and principles of IHL in Outer Space

Even if accepted as applicable in Outer Space, the unique characteristics of Space assets currently in use, the methods and means of warfare that are likely to be employed during Space conflicts and Outer Space itself present unique challenges to the practical implementation of the rules and principles of IHL in the Outer Space context. The basic rule for the applicability of the Law of

⁸⁴ Hague Regulations, Article 23(e); Additional Protocol I, Article 35(2).

⁸⁵ Matthew T. King and Laurie R. Blank, 'Symposium on the New Space Race International Law and Security in Outer: Now and Tomorrow' (2019) 113 AJIL 129.

⁸⁶ Dale Stephens, 'The International Legal Implications of Military Space Operations: Examining the Interplay between International Humanitarian Law and Outer Space Legal Regime' (2018) 94 Int'l L. Stud 75, 97.

⁸⁷ Stephen Freeland, 'Peaceful Purposes? Governing the Military Uses of Outer Space' (Research Paper No. 03/2017 Legal Studies Research Paper Series, 2015, Western Sydney University School of Law) 50

Armed Conflict is that the Law of Armed Conflict applies only when armed conflict already exists, which means that the level of force used must be sufficient so as to render a military activity an international armed conflict. Given the technologically advanced nature of Space assets, for example, the provision of significant services by a single satellite, as well as the technologically advanced capabilities of modern weaponry, for example, the ability to destroy a satellite through the use of a single ASAT missile, the determination of the level of force that would constitute sufficient use of force may prove difficult. Would the use of one kinetic missile or the destruction of a single satellite be considered sufficient? And if so, should the use of force be measured in relation to the force of the weapon or the level of damage to the target? The use of soft-kill methods also presents difficulties. Considering that interference with a satellites could range from soft-kill to hard-kill methods the question whether soft-kill methods, such as electronic warfare, when conducted independently, that is, not as an integral part of warfare but rather as an isolated incident, would be considered sufficient use of force is particularly relevant. Should force be still defined by the actual force used or by the effects of the attack, for example, in consideration of the importance of the asset and the impact of the attack on the provision of services?⁸⁸ The implementation of the customary principle of distinction in the Outer Space context may also prove difficult. The principle of distinction demands that the parties to a conflict must distinguish between civilian objects and military objectives at all times and that attacks may only be directed against military objectives.⁸⁹ Military objectives are defined as objects: *which by nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralisation, in the circumstances ruling at the time, offers a definite military advantage.*⁹⁰ Distinguishing between military objectives and civilian objects is particularly difficult in the context of Outer Space since Space assets are generally used for both civilian and military purposes.⁹¹ The dual use of Space assets for civilian and military purposes also renders the implementation of the precautionary principle difficult. Article 57 of Additional Protocol I imposes *inter alia* the obligations that in the conduct of military operations constant care shall be taken to spare civilian objects⁹² and that an attack be cancelled or suspended if it becomes apparent that the objective is not a military one.⁹³

The main provision for the protection of the environment, Article 35(3) of Additional Protocol I, imposes a significantly high threshold capable of enabling significant damage to escape the provision. If the cumulative requirement of ‘widespread, long-term and severe’ damage is a problem on Earth, the vastness of Outer Space certainly magnifies this problem. The principle of proportionality suffers similar difficulties. The principle of proportionality prohibits damage that is excessive in relation to the military advantage sought by the military action.⁹⁴ Considering that the outer limits of Outer Space are undefined, establishing whether the damage is proportional to the military advantage sought may prove difficult if not impossible. While delimiting the outer boundary of Outer Space to the outer boundary of the area subject to human activities may ease the problem, the delimitation may also result in a situation where environmental damage that falls outside this boundary is ignored. Foreseeability of the exact nature of the environmental damage

⁸⁸ Matthew T. King and Laurie R. Blank, ‘Symposium on the New Space Race International Law and Security in Outer: Now and Tomorrow’ (2019) 113 AJIL 129.

⁸⁹ Additional Protocol I, Art 48; Jean-Marie Henckaerts, ‘Study on customary international humanitarian law: A contribution to the understanding and respect for the rule of law in armed conflict’ (2005) 87(857) International Review of the Red Cross (hereinafter Study on Customary International Humanitarian Law), 198, Rule 7.

⁹⁰ Additional Protocol I, Article 52(2).

⁹¹ Dale Stephens and Cassandra Steer, ‘Conflicts in Space: International Humanitarian Law and its application to Space Warfare’ (2015) XL Annals of Air and Space Law 1, 18.

⁹² Additional Protocol I, Article 57(1).

⁹³ Additional Protocol I, Article 57(b).

⁹⁴ Additional Protocol I, Articles 51(5)(b), 57(2)(a)(iii) and 57(b).

that could be caused by a military action in is also extremely difficult.⁹⁵ In terms of prevention, the customary principle of due regard requires that the methods and means of warfare must be employed with due regard to the protection and preservation of the natural environment and that in the conduct of military operations all feasible precautions must be taken to avoid and in any event to minimise incidental damage to the environment.⁹⁶ Adopting traditional methods, for example, environmental impact assessments, may prove insufficient.

Can the above mentioned rules and principle of IHL be sufficiently adapted to operate in the Outer Space context? There is no reason why not since it is likely that if the situation so demands, the threshold for sufficient use of force and the interpretation of the principles of distinction and proportionality in the Outer Space context would be determined by State practice. A safety net and an aspect capable of balancing any substantial distortions is the importance of Space technology to the public at large, which means that not only Space security is now a shared concern⁹⁷ but also that any damage to public and private infrastructure is likely to become subject to and hence further regulated by public scrutiny. The threshold for Article 35(3) of Additional Protocol I in the context of Outer Space, however, may not be determined as quickly since: (1) the probability that any one State would intentionally seek to cause widespread, long-term and widespread damage to the environment or implement methods or means of warfare that are likely to cause such damage in a shared zone where the State itself operates is low, (2) the current uses of Outer Space and the nature of the technology used do not invite such extreme action, and (3) unless the outer boundary of human-active Outer Space would be delimited, the calculation of ‘widespread, long-term and severe’ damage is likely to remain indeterminate.

Responsibility for environmental damage and the applicability of Article 8(2)(b)(iv) of the Rome Statute in Outer Space

Currently, International Law does not impose criminal liability for environmental damage on States and the only obligation of the State causing the damage is to make reparations⁹⁸ whether the damage was caused by peaceful activities or armed conflicts. The general principle for State responsibility is stated in Article 1 of the ILC Articles on State responsibility for internationally wrongful acts⁹⁹: *Every internationally wrongful act of a State entails the international responsibility of that State*. An internationally wrongful act is committed when conduct consisting of an act or omission is attributable to the State under International Law and the act or omission constitutes a breach of an international obligation of the State.¹⁰⁰ Reparation for environmental damage can be made through restitution, compensation or a combination of both.¹⁰¹ Peaceful activities in Outer Space (including the weaponisation of Outer Space and non-aggressive military activities) are governed by the rules and principles of Space Law. Article VII of the Outer Space Treaty provides that a State party that launches or procures the launching of an object into Outer Space and a State party from whose territory the object is launched, is internationally liable for damage that is caused by the object or its component parts to another State party (or its persons) either on Earth, in the air

⁹⁵ Matthew T. King and Laurie R. Blank, ‘Symposium on the New Space Race International Law and Security in Outer: Now and Tomorrow’ (2019) 113 AJIL 129.

⁹⁶ Study on Customary International Humanitarian Law, Rule 44.

⁹⁷ Sergio Marchisio, ‘The final frontier: Prospects for arms control in outer space’ (2019, European Leadership Network) 2.

⁹⁸ International Law Commission, Responsibility of States for Internationally Wrongful Acts, G.A. Res 56/83 annex, U.N. Doc. A/Res/56/83 (Dec. 12, 2001) Article 31(1).

⁹⁹ International Law Commission, Responsibility of States for Internationally Wrongful Acts, G.A. Res 56/83 annex, U.N. Doc. A/Res/56/83 (Dec. 12, 2001)

¹⁰⁰ International Law Commission, Responsibility of States for Internationally Wrongful Acts, G.A. Res 56/83 annex, U.N. Doc. A/Res/56/83 (Dec. 12, 2001) Article 2.

¹⁰¹ International Law Commission, Responsibility of States for Internationally Wrongful Acts, G.A. Res 56/83 annex, U.N. Doc. A/Res/56/83 (Dec. 12, 2001) Article 34.

or in Outer Space. The Liability Convention imposes a stricter regime for damage caused by Space objects on its signatories, however, the stricter regime is limited to damage that is caused either on Earth or in the air. Article II of the Liability Convention States that the launching State shall be *absolutely* liable to pay compensation for damage caused by its Space objects on the surface of Earth or to aircraft flight (emphasis added), and therefore is a strict liability provision. Space objects are defined so as to include their components parts as well as their launch vehicles and parts thereof.¹⁰² Pursuant to Article III of the Liability Convention, if the damage is caused to a Space object (or persons or property on board) elsewhere than on the surface of Earth, the State responsible is only liable if the damage occurred due to its fault or the fault of persons for whom it is responsible. The operation of the Liability Convention in the context of damage caused by Space objects, however, has not yet been tested since although the opportunity to find under the liability Convention did arise in connection with the Cosmos 954 incident, the claim against the Soviet Union was settled by the payment of \$3,000,000.00 out of the \$6,000,000.00 claimed by Canada.¹⁰³ The OST also imposes international responsibility under Article IX for breach of the principle of non-intervention. The first part of Article IX (which is the outmost environmental provision of the OST) states that:

...States Parties to the Treaty shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose.

The second part of Article IV imposes the duty of consultation where a State party has reason to believe that an activity or experiment that the State or its nationals plan to conduct in Outer Space would cause potentially harmful interference with activities of other State Parties in the peaceful exploration and use of Outer Space. Consultation therefore must be conducted prior to proceeding with the planned activity or experiment. Thus far, the operation of Article IX of the OST came into consideration only twice. The first following the 2007 China's destruction of its own FY-1C weather satellite at about 537 miles up in low Earth orbit without prior consultation and the second following the 2008 U.S' destruction of its own USA-193 satellite at an altitude of about 133 miles, which the US claimed did not invoke State responsibility since the satellite fell into low orbit and its destruction was necessary¹⁰⁴.¹⁰⁵ It has been argued that had the US recognised the applicability of Article IX in the situation and conducted consultation, States planning kinetic experiments would now come under scrutiny if they do not consult as well as provide the opportunity for setting a standard for appropriate conduct in relation for consultation as well as for setting a threshold for debris generation that clarifies when a State should have reason to believe that their planned activities would cause harmful interference.¹⁰⁶ It has also been suggested that since both incidents resulted in Space debris and as a result risk to Space assets and by extension potential interference with peaceful activities, the fact that China was considered in breach and the U.S. intercept was defensible¹⁰⁷ suggests that the focus of the provision is on the knowledge that the activity will interfere with the peaceful use of Outer Space rather than on the interference itself, which sets a

¹⁰² Liability Convention, Article 1(d).

¹⁰³ Robert A. Ramey, 'Armed Conflict on the Final Frontier: the Law of War in Space' (2000) 48 A. F. L Rev, 1, 91.

¹⁰⁴ Michael C. Mineiro, 'FY-1C and USA-193 ASAT Intercepts: An Assessment of Legal Obligations under Article IX of the Outer Space Treaty' (2008) 34 Journal of Space Law 321, 349.

¹⁰⁵ Michael C. Mineiro, 'FY-1C and USA-193 ASAT Intercepts: An Assessment of Legal Obligations under Article IX of the Outer Space Treaty' (2008) 34 Journal of Space Law 321, 321-322.

¹⁰⁶ Michael C. Mineiro, 'FY-1C and USA-193 ASAT Intercepts: An Assessment of Legal Obligations under Article IX of the Outer Space Treaty' (2008) 34 Journal of Space Law 321, 353.

¹⁰⁷ Michael C. Mineiro, 'FY-1C and USA-193 ASAT Intercepts: An Assessment of Legal Obligations under Article IX of the Outer Space Treaty' (2008) 34 Journal of Space Law 321, 351-352.

high threshold for ‘potential harmful interference’ that would inform the interpretation of the provision if armed conflict ensues.¹⁰⁸

Breaches of the of the Hague Convention IV, ENMOD, and the environmental provisions of Additional Protocol I also prescribe State responsibility. To date, the only successful claim for environmental damage caused during armed conflict is the claim against Iraq for the environmental damage caused during its invasion of Kuwait (although the claim was brought on the basis of illegal war¹⁰⁹ rather than on the basis of a breach of *jus in bello* for the protection of the environment). It has also been argued that even if reparations were to be imposed in a more strict manner, it is unlikely that the obligation to pay compensation would prove an effective enforcement mechanism since it is unlikely that States would be willing to risk defeat.¹¹⁰ Interestingly, a similar observation has been made in regard to Liability Convention. It has been argued that although the Liability Convention imposes State responsibility, it is unlikely that the responsibility imposed would affect the decision of a State to engage in the use of force in Space or its choice of the means and methods employed.¹¹¹ A second challenge to State responsibility is the principle of no appropriation, which could pose difficulties in the practical implementation of a compensation system in a no territory environment. If Space conflicts are a real threat, then the enforcement mechanisms for the law that governs military activities that satisfy the definition of international armed conflicts in Outer Space must be strengthened in as far as possible. One of the considerations relevant to this situation is the question whether Article 8(2)(b)(iv) of the Rome Statute of the International Criminal Court (ICC) is applicable in Outer Space. Out of the IHL provisions that offer protection to the environment in its own right, Article 8(2)(b)(iv) is the only provision capable of imposing criminal liability for environmental damage. Pursuant to Article 5 of the Rome Statute the ICC has jurisdiction with respect to the crime of genocide, crimes against humanity, war crimes and the crime of aggression. Pursuant to Article 5(c) of the *Rome Statute*, the ICC has jurisdiction to trial war crimes for grave breaches of the 1949 *Geneva Conventions* and their 1977 *Protocols* and serious violations of the laws and customs applicable in international armed conflict. Indictments for war crimes, however, can be brought against individuals only¹¹², for example, the commander responsible for the commission of the crime or persons following orders.¹¹³ The Rome Statute also offers limited remedies and does not include provisions that order recovery from individuals further than proceeds, property and assets derived from the crime¹¹⁴, however, while these limitations exists, the threat of criminal prosecution has high deterrent value for indictable decision makers.¹¹⁵ Article 8(2)(b)(iv) classifies as a war crime the:

Intentionally launching an attack in the knowledge that such an attack will cause incidental loss of life or injury to civilians or damage to civilian objects, or widespread, long-term and severe damage to the natural environment that would be clearly excessive in relation to the concrete and direct overall military advantage anticipated

¹⁰⁸ Dale Stephens, ‘The International Legal Implications of Military Space Operations: Examining the Interplay between International Humanitarian Law and Outer Space Legal Regime’ (2018) 94 Int’l L. Stud 75, 88.

¹⁰⁹ UN Doc S/Res/687 (1991), Paragraph 16: *Iraq . . . is liable under international law for any direct loss, damage, including environmental damage and the depletion of natural resources, or injury to foreign governments, nationals and corporations, as a result of Iraq’s unlawful invasion and occupation of Kuwait.*

¹¹⁰ Michael N. Schmitt, ‘Green War: An Assessment of the Environmental Law of International Armed Conflict’ (1997) 22 YJIL 1, 91.

¹¹¹ Robert A. Ramey, ‘Armed Conflict on the Final Frontier: the Law of War in Space’ (2000) 48 A. F. L Rev, 1, 91.

¹¹² Statute of the International Criminal Court, July 17 1998, 2187 U.N.T.S. 90 (hereinafter Rome Statute), Article 25(1), (2) and (3)(a)-(d), (f).

¹¹³ Rome Statute, Article 28 and 33(1); Individual criminal responsibility does not affect State responsibility and is in addition to State responsibility, Rome Statute, Article 25(4).

¹¹⁴ Rome Statute, Article 77(2)(b).

¹¹⁵ Jessica C. Lawrence and Kevin Jon Heller, ‘The limits of Article 8(2)(B)(IV) of the Rome Statute, the first ecocentric environmental war crime’ (2007) 20 GIELR 1, 12.

Article 8 of the Rome Statute lists other crimes that are relevant to the protection of the environment¹¹⁶, however, these are predominantly anthropocentric and only lend to the protection of the environment to the extent of its role as part of the anthropocentric interest addressed.¹¹⁷ Also noted is that Article 8 does not address Nuclear, biological or chemical weapons. Article 8(2)(b)(XVII) and (xviii) only refer to poison or poisoned weapons and poisonous or other gases and analogous liquids, materials or devices respectively. Article 8(2)(b)(xvi) on pillage is also relevant to the protection of the environment particularly due to resource warfare, however, this is not necessarily relevant to the Space environment at this point in time.

Is Article 8(2)(b)(iv) of the Rome Statute applicable in Outer Space?

Conceptually, there is no reason why not since neither the Rome Statute nor Article 8(2)(b)(iv) itself exclude such possibility. The jurisdiction of the ICC to trial war crimes although subject to certain limitations and conditions is universal¹¹⁸, which suggests that the focus of the provision is on the crime itself disregard of the location where the crime occurs even if Outer Space. Article 8(2)(b)(iv) deals with the crime itself and does not make any reference to or imposes any conditions that expressly or impliedly exclude its applicability in Outer Space.

Is Article 8(2)(v)(iv) likely to be an effective mechanism in the context of Outer Space?

While Article 8(2)(b)(iv) should be considered applicable in the Outer Space context and of a high deterrent value to individuals, its effectiveness is likely to be hindered by similar limitations that influence its effectiveness in the terrestrial environment being procedural barriers for bringing a case before the Court, the jurisdictional limitations of the ICC and the high thresholds that arise from the elements of the crime as well as by the technical complexities of Space orientated methods and means of warfare likely to be employed during Space conflicts. One of the most likely characteristics of Space conflicts is the involvement of high tech means and methods of warfare including the use of automated weapons, laser weapons and electronic attacks. Hearing a case involving such technological advance, therefore, will require that judges and military experts assisting the Court would have sufficient knowledge and understanding of the technology involved.¹¹⁹

Discretionary referrals

To be heard, a case must be referred to the ICC by either a State party¹²⁰, the Security Council¹²¹ or the prosecutor subject to the approval of the be referred to Pre-Trial Chamber.¹²² Both the *Geneva Convention IV* and *Additional Protocol I* impose on States the obligation to prosecute or extradite

¹¹⁶ Other War crimes relevant to the protection of the environment under under the Rome Statute include: The extensive destruction and appropriation of property, not justified by military necessity and carried out unlawfully and wantonly (a grave breach), Article 8(2)(a)(iv); Intentionally directing attacks against civilian objects, Article 8(2)(b)(ii); Attacking or bombarding, by whatever means, towns, villages, dwellings or buildings which are undefended and which are not military objectives, Article 8(2)(b)(v); Destroying or seizing the enemy's property unless such destruction or seizure be imperatively demanded by the necessities of war, Article 8(2)(b)(xiii); Pillaging a town or place, even when taken by assault, Article 8(2)(b)(xvi); Employing poison or poisonous weapons, Article 8(2)(b)(xvii); Employing asphyxiating, poisonous or other gases, and all analogous liquids, materials or devices, Article 8(2)(b)(xviii).

¹¹⁷ Mark A. Drumbl, 'Accountability for Property Crimes and Environmental War Crimes:

Prosecution, Litigation, and Development' (2009, International Center for Transitional Justice Washington and Lee University) 8.

¹¹⁸ Article 12(3) of the Rome Statute permits non-parties to accept the jurisdiction of the ICC.

¹¹⁹ Lindsay Freeman, 'Law in Conflict The technological transformation of war and its consequences for the International Criminal Court' (2019) JILP 807, 855

¹²⁰ Rome Statute, Article 13(a).

¹²¹ Rome Statute, Article 13(b).

¹²² Rome Statute, Article 13(c), 15(3) and (4).

individuals that commit grave breaches of these conventions¹²³, however, since Article 8(2)(b)(iv) is not listed under the heading ‘grave breaches’, but rather under the section for ‘Other serious violations of the laws and customs applicable in international armed conflict, within the established framework of international law’, States are under no obligation to prosecute the crime and the criminal prosecution of individuals responsible for environmental damage is subject to the discretion of the States. The only grave breach that relates to the environment is the breach of Article 53 of the *Geneva Convention IV*, which prohibits the extensive destruction and appropriation of property not justified by military necessity and carried out unlawfully¹²⁴, which is listed in Article 8(2)(a)(iv) of the *Rome Statute*. Referrals by the Security Council require that the decision to refer the case must pass by a vote of nine of the fifteen members and that (other than on procedural matters) the nine votes must include the concurring votes of the permanent members, which are China, France, Russia, the U.S. and the UK and which all have the power to veto the decision to refer the case to the Court.¹²⁵ Considering that some of these countries are major participants in the militarisation and weaponisation of space, this may prove a problem.

Jurisdictional limitations

Although pursuant to Article 5 of the Rome Statute the ICC has jurisdiction to hear cases relating to the war crimes, the jurisdiction of the Court in relation to Article 8(2)(b)(iv) is conditional on the existence of an international armed conflict.¹²⁶ Article 8(2)(e) of the Rome statute on war crimes applicable in non-international armed conflicts does not list as a war crime the Intentionally launching an attack in the knowledge that such an attack will cause incidental loss of life or injury to civilians or damage to civilian objects, or widespread, long-term and severe damage to the natural environment that would be clearly excessive in relation to the concrete and direct overall military advantage anticipated. Article 8(2)(b)(iv) itself is listed under the heading: *Other serious violations of the laws and customs applicable in international armed conflict, within the established framework of international law....* Considering that most armed conflicts today are non-international¹²⁷ this may present a problem since space faring States as well as other parties may employ Space assets to resolve internal conflicts. Whether armed groups involved in non-international armed conflicts are capable of causing widespread, long-term and severe damage to the natural environment in Outer Space is uncertain, however, it must be borne in mind that some groups did demonstrate technological capacity to effectively utilise electronic means, particularly the internet and social media.¹²⁸ It has been argued that: *technology is the great equalizer. Old assumptions about the capacity, military strength, and political power of individuals and non-state groups may no longer hold true.*¹²⁹ The jurisdiction of the court is also limited to the most serious crimes of concern to the international community as whole¹³⁰ and to war crimes that are committed as part of a plan or policy or as part of a large-scale commission of such crimes¹³¹ and is also subject to State consent. Except for cases referred to the ICC by the Security Council, the State

¹²³ Geneva Convention IV, Article 146; Additional Protocol I, Article 85(1); Other provisions for voluntary referral: ENMOD, Article IV and Biological Weapons Convention, Article IV.

¹²⁴ Geneva Convention IV, Article 147.

¹²⁵ Joe Sills, Jerome C. Glenn, Elizabeth Florescu and Theodore J. Gordon, ‘Environmental Crimes in Military Actions and the International Criminal Court (ICC) - United Nations Perspective’ (AEPI-IFP-0502A, 2001, Army Environmental Policy Institute) 11.

¹²⁶ Rome Statute, Article 5(1) and 8(2)(b)(iv).

¹²⁷ Mark A. Drumbl, ‘Accountability for Property Crimes and Environmental War Crimes: Prosecution, Litigation, and Development’ (2009, International Center for Transitional Justice Washington and Lee University) 9.

¹²⁸ Lindsay Freeman, ‘Law in Conflict The technological transformation of war and its consequences for the International Criminal Court’ (2019) JILP 807, 833.

¹²⁹ Lindsay Freeman, ‘Law in Conflict The technological transformation of war and its consequences for the International Criminal Court’ (2019) JILP 807, 855.

¹³⁰ Rome Statute, Article 1.

¹³¹ Rome Statute, Article 8(1).

where the crime was committed or the State that the accused is a national of must accept the jurisdiction of the Court if the State concerned is not a signatory to the Rome Statute.¹³² Since no State territory exists in Space and registered Space assets are only under the jurisdiction and control of the State¹³³, the reference to the State where the crime was committed is currently irrelevant. Pursuant to Article 12(2)(a) of the Rome Statute, however, the ICC may exercise jurisdiction over the State of registration if the crime was committed on board a vessel or aircraft. While the provision makes specific reference to vessels and aircraft, which suggest that the provision applies to crimes committed at sea and in the air, since the provision applies to areas outside the territory of the State of registration, it could potentially be interpreted so as to also extend to the State of registration of a Space asset. A main uncertainty that arises from the voluntary jurisdiction of the ICC is the question whether the ICC has jurisdiction to hear a case in situations where the relevant State is not a party to the Rome Statute and does not voluntarily accept the jurisdiction of the Court.¹³⁴ The ICC also does not have jurisdiction to hear a case where the case is being investigated or prosecuted by the State which has jurisdiction over the case unless the State is unwilling or unable genuinely to carry out the investigation or prosecution¹³⁵, where the State decided not to prosecute the person concerned, unless the decision resulted from the unwillingness or inability of the State genuinely to prosecute¹³⁶, the person has already been tried by the relevant State¹³⁷ or where the case is not of sufficient gravity to justify further action by the Court¹³⁸.

Substantive difficulties relating to the elements of the crime

Even where a case is successfully referred to the ICC and the ICC has jurisdiction to hear the case the likelihood that the elements of Article 8(2)(b)(iv) would be satisfied is substantially low. The elements of the crime are: (1) Intentionally causing an attack, (2) in the knowledge that the attack will cause widespread, long-term and severe damage to the natural environment, and (3) which would be clearly excessive in relation to the concrete and direct overall military advantage anticipated. There are several difficulties and uncertainties that arise in connection with these requirements. The first is that the *mens rea* requirement is substantially high. Article 8(2)(b)(iv) requires that the individual accused would have had the knowledge that the attack will result in widespread, long-term and severe environmental damage as well as knowledge that the damage that would result from the attack would be clearly excessive relative to the overall military advantage anticipated. Apart from the general difficulties associated with proving what the accused actually knew, satisfying the requirement of 'in the knowledge that the attack will result in widespread, long-term and severe damage' could prove extremely difficult in the lack of an objective test. Similarly to Article 35(3) of Additional Protocol I, the Rome statute does not define the terms 'widespread', 'long-term' and 'severe' leaving the three terms ambiguous. Considering that pursuant to Article 22(2) of the Rome Statute the definition of the crime must be strictly construed

¹³² Rome Statute, Article 12(2).

¹³³ *A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object*, Outer Space Treaty, Article 8.

¹³⁴ Jessica C. Lawrence and Kevin Jon Heller, 'The limits of Article 8(2)(B)(IV) of the Rome Statute, the first ecocentric environmental war crime' (2007) 20 GIELR 1, 30

¹³⁵ Rome Statute, Article 17(1)(a); The Preamble to the Rome Statute also emphasises that that the International Criminal Court established under this Statute shall be complementary to national criminal jurisdictions.

¹³⁶ Rome Statute, Article 17(1)(b); Article 17(2) of the Rome Statute states that: *In order to determine unwillingness in a particular case, the Court shall consider, having regard to the principles of due process recognized by international law, whether one or more of the following exist, as applicable: (a) The proceedings were or are being undertaken or the national decision was made for the purpose of shielding the person concerned from criminal responsibility for crimes within the jurisdiction of the Court referred to in Article 5; (b) There has been an unjustified delay in the proceedings which in the circumstances is inconsistent with an intent to bring the person concerned to justice; (c) The proceedings were not or are not being conducted independently or impartially, and they were or are being conducted in a manner which, in the circumstances, is inconsistent with an intent to bring the person concerned to justice.*

¹³⁷ Rome Statute, Article 17(1)(c).

¹³⁸ Rome Statute, Article 17(1)(d).

and in case of ambiguity the definition shall be interpreted in favour of the person being investigated, prosecuted or convicted, the likelihood of succeeding in a claim based on this requirement is substantially low.¹³⁹ The provision also does not allow for negligence, wilful blindness or reckless behaviour.¹⁴⁰ A second issue and substantial to the protection of the environment is that the crime must satisfy the elements of Article 8(2)(b)(iv) without taking into account collateral damage that results from the attack since the damage must result from *intentionally* launching an attack in the knowledge that such an attack will cause widespread, long-term and serious damage to the natural environment which would be clearly excessive in relation to the concrete and direct overall military advantage anticipated (emphasis added). Unintentional damage, therefore, does not fall within the ambit of the provision.¹⁴¹ Considering the current uses of Outer Space and the nature of Space assets currently in use, the likelihood that the threshold of widespread, long-term and severe damage short of accounting for collateral damage as well will be satisfied at least in the near future is substantially low.

Conclusion

If there is anything that can be said with certainty it is that the rate of development in Space technology has exceeded the rate of development of International Law that governs military activities in Outer Space. The OST, which is the main instrument governing human activities in Outer Space is founded on the understanding that Space would be used for peaceful purposes and as a result cannot sufficiently govern in the situation of an armed conflict or sufficiently address the current military uses of outer space for military purposes including the use of Space technology to facilitate terrestrial conflicts as demonstrated by the current interpretation of the term ‘peaceful use’. IHL, with the last main development occurring in 1977, also does not directly address the means and methods of warfare that are likely to be employed in the event of Space conflicts, which leads to the question whether an isolate electronic attack on a single Space asset, for example, is sufficient use of force capable to invoke the applicability of the Law of Armed Conflict. The capacity of the Law of Armed Conflict if applicable to effectively regulate aggressive conduct in a manner consistent with the general spirit and direction of Space Law also presents challenges that would require the implementation of mutual supportiveness methods. The nature of Space technology currently in use and of Space itself pose difficulties to the practical implementation of the Law of Armed Conflict relevant to the protection of the environment. IHL provisions and customary principles relevant to the protection of the environment during armed conflicts are particularly challenged by the lack of delimitation of the outer limits of Outer Space, which renders the thresholds for proportionality and widespread, long-term and severe damage indeterminate. The delimitation of the Outer limits of the zone subject to human activities for legal purposes is therefore essential. Another main challenge that requires further consideration is the dual use of Space assets for both civilian and military purposes, which necessitates a common standard for differentiating military objectives from civilian objects.

Short of strengthening the hard law regime, the most likely consequence of the gaps that exist within the legal regime that regulates human activities in Outer Space is that permissible thresholds for both peacetime and aggressive military operations would develop according to State practice. Unless it is accepted that the faith of Outer Space must be influenced by security concerns, the

¹³⁹ Jessica C. Lawrence and Kevin Jon Heller, ‘The limits of Article 8(2)(B)(IV) of the Rome Statute, the first ecocentric environmental war crime’ (2007) 20 GIELR 1, 7.

¹⁴⁰ Mark A. Drumbl, ‘Accountability for Property Crimes and Environmental War Crimes: Prosecution, Litigation, and Development’ (2009, International Center for Transitional Justice Washington and Lee University) 9.

¹⁴¹ Joe Sills, Jerome C. Glenn, Elizabeth Florescu and Theodore J. Gordon, ‘Environmental Crimes in Military Actions and the International Criminal Court (ICC) - United Nations Perspective’ (AEPI-IFP-0502A, 2001, Army Environmental Policy Institute) 12

development of international norms must be both directed and controlled so as to balance all interests involved. Of significant importance at this point in time is investment in two courses of action. The first is dialogue and the second is the development of manuals that analyse and clarify the operation of International Law in the Outer Space context. While not necessarily legally binding, the clarification of the law applicable and the interaction between Space Law and the Law of Armed Conflict is likely to promote common understandings that may influence State practice as well as support the construction of legally sound arguments capable of counteracting unlawful conduct in the context of armed conflicts to, from, in and through Outer Space.

Considering current investment in the new Space race, it is unlikely that the environmental consequences of armed conflicts would take precedent over security concerns, which leads to the necessary conclusion that the enforcement mechanisms for the Law of Armed Conflict relevant to the protection of the environment must also be strengthened so as to effectively deter breaches. In its current state, the legal regime prescribes State responsibility, which as has been recognised, is generally ineffective when faced with the risk of defeat. The challenges involved in the practical implementation of a compensation system in a no territory environment also do not only require that appropriate mechanisms be established but even more significantly that stronger investment in Space debris mitigation efforts is required as well as the development of preventative measures and standards.

Criminal liability for individuals responsible for environmental crimes, while a strong deterrent, is subject to jurisdictional and procedural barriers for bringing a case before the ICC as well as burdened by the high thresholds that arise from the elements of the crime itself, which are exacerbated in the Outer space context and further reduce the probability of a successful claim. Of significant importance is the fact that the jurisdiction of the Court is limited to International armed conflicts. Considering that the most prevalent form of armed conflicts today is non-international armed conflicts and considering the changes in the typology of non-international armed conflicts and the possibility that such conflicts may extend to Outer Space as well as the developments in the technological capacity of armed groups, there is strong merit in considering the extension of Article 8(2)(b)(iv) to non-state actors. The jurisdiction of the Court is also substantially affected by its voluntary jurisdiction system. Considering the potential impact of Space orientated conflicts on both the terrestrial and Outer Space environments, it appears reasonable that exceptions for the context of Outer Space should be considered.