

# **How the Principle of Humanity in International Humanitarian Law can inform Weapons Regulation in Outer Space**

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## Plagiarism Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of PhD in Law and Criminology, is entirely my own work and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.



Signed:

CIARA FINNEGAN

Dated: 25/06/2023

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## Thesis Summary

Activity in Outer Space has increased significantly in recent times, with new Space actors and new technologies emerging. This has resulted in Outer Space becoming a crowded and tense environment in which the possibility of the use of weapons grows ever nearer. The consequences of such weapons use in Outer Space would be felt by humankind as a whole.

The law that governs the conduct of armed conflicts, and the use of weapons during these periods of conflict, is International Humanitarian Law (IHL). However, weapons regulation in IHL struggles to keep pace with the development of weapons technologies which can be used in Outer Space. In addition, International Space Law (ISL) does not prohibit the use of all weapons in Outer Space. This research addresses this gap in the ISL and IHL frameworks with regards to the regulation of weapons use in Outer Space. IHL was founded on the basis of four principles – distinction, military necessity and proportionality, all of which stem from the central principle of humanity. It was in the Martens Clause of the 1899 Hague Convention II that this central principle of humanity was referenced as providing guidance and applying in the absence of express legislation. Therefore, the principle of humanity is currently addressing this gap by providing a minimum standard of protection based on the considerations of what is in the interests of humanity with regards to the regulation of the use of weapons in Outer Space.

This research forms recommendations for express regulation, from the perspective of this central principle of humanity, as it is premised that this approach will inform regulation with a view to protecting humankind from the consequences of the use of weapons in Outer Space.

## Abbreviations

IHL	International Humanitarian Law
ISL	International Space Law
ESA	European Space Agency
ASAT	Anti-Satellite Weapons
NATO	North Atlantic Treaty Organisation
ICJ	International Court of Justice
ICTY	International Criminal Tribunal for the former-Yugoslavia
ICTR	International Criminal Tribunal for Rwanda
IAC	International Armed Conflict
NIAC	Non-International Armed Conflict
LOAC	Law of Armed Conflict
ICRC	International Committee of the Red Cross
CCW	Convention on Certain Conventional Weapons
NPT	Non – Proliferations Treaty
UN	United Nations
UNCOPUOS	UN Committee on the Peaceful Uses of Outer Space
UNOOSA	UN Office for Outer Space Affairs
OPCW	Organisation for the Prohibition of Nuclear Weapons
EU	European Union

TFEU	Treaty on the Functioning of the European Union
NASA	National Aeronautics and Space Administration.
ENMOD	Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques
PPWT	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
USSR	Union of Soviet Socialist Republics
GEO	Geosynchronous Orbit
LEO	Low Earth Orbit
ITU	International Telecommunications Union
ABM	Anti – Ballistic Missile
UN GA	United Nations General Assembly
CSIS	Centre for Strategic and International Studies
ROE	Rule of Engagement
EMP	Electro-Magnetic Pulse
ISS	International Space Station
UNIDIR	UN Institute for Disarmament Research
PAROS	Prevention of an Arms Race in Outer Space
LAWs	Lethal Autonomous Weapons
FAWs	Fully Autonomous Weapons

PMC Private Military Corporation

NSAG Non – State Armed Group



## **Chapter 1: Introduction**

### **1.0 Introduction**

Humankind has been fascinated with Outer Space, even before the first exploration attempts in the 1950s and this relationship has transformed from then to now. This research focuses on the ever-evolving environment of Outer Space and the need for the regulation of the use of weapons in this domain. The central research question investigates how the principle of humanity in International Humanitarian Law (IHL), the law that applies during armed conflict, can be used to form recommendations for such regulation. In doing so, this research addresses a gap in the international legal frameworks concerning Outer Space and weapons regulation. This thesis asks how Outer Space should be regulated and makes a number of conclusions as to the form that this regulation should take. The lens through which this thesis scrutinises this question is the principle of humanity. The adoption of this principle as the lens of this research grounds the recommendations that it forms firmly in IHL and considerations of the reduction of unnecessary suffering – central considerations in relation to the use of weapons in Outer Space.

#### **1.0.1 Current Activity in Outer Space**

Outer Space is a domain of increased international attention and activity, as seen most recently with India's Chandrayaan-3 mission which involved a successful lunar landing on 23<sup>rd</sup> August 2023.<sup>1</sup> This is an important achievement “[g]iven that Russia had tried and

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<sup>1</sup> BBC News, ‘Chandrayaan-3: India makes historic landing near Moon's south pole’ (23 August 2023) <<https://www.bbc.com/news/world-asia-india-66594520>> accessed 31 August 2023.

failed to land the probe, Luna 25, on the Moon a few days earlier”.<sup>2</sup> India stepping ahead of Russia in a Moon landing activity is illustrative of the development that has occurred since the era of the ‘Space Race’. The original ‘Space Race’ was a competition to achieve Space exploration, occurring predominantly during the Cold War, where “the behaviour of the Soviet Union and the United States dominated space security considerations.”<sup>3</sup> Now, there are different Space actors and one of the former ‘Space Powers’ is being overtaken by India, a relatively new space actor.<sup>4</sup> States are now not the only actors in Outer Space – private companies are also carrying out many activities in this area.<sup>5</sup> Examples such as Elon Musk’s SpaceX,<sup>6</sup> Jeff Bezos’ Blue Origin<sup>7</sup> and Richard Branson’s Virgin Galactic<sup>8</sup> show that Outer Space has never been so accessible. These private actors are pioneering the offer of Space tourism flights to customers,<sup>9</sup> while SpaceX also operates

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<sup>2</sup> Christopher Newman, ‘India has landed on the Moon: here’s what the political and economic gains are’ (The Conversation, 30 August 2023) <<https://theconversation.com/india-has-landed-on-the-moon-heres-what-the-political-and-economic-gains-are-212313>> accessed 31 August 2023.

<sup>3</sup> James Clay Moltz, *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests* (3<sup>rd</sup> edn, Stanford University Press 2019) 11. See also P.J. Blount, ‘Renovating Space: The Future of International Space Law’ (2011) 40(1) *Denver Journal of International Law & Policy* 515, 516: “[t]he popular narrative that accompanies the Space Race at the beginning of the “space age,” involves two superpowers vying for technological superiority over the other.”

<sup>4</sup> This could be contested as seen in Rajeswari Pillai Rajagopalan, ‘Managing New Actors in the Space Domain’ (The Diplomat, 29 June 2019) <<https://thediplomat.com/2019/06/managing-new-actors-in-the-space-domain/>> accessed 3 September 2023: “even countries like India and China and others who have pursued space programs for a few decades now can be called new actors in space.”

<sup>5</sup> Stephan Hobe, ‘The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of Space-Faring Nations)’ (2010) 15(3 & 4) *Uniform Law Review* 869, 871: “[t]he private launching enterprise, Space X” and 874: “firms such as Virgin Galactic are now offering suborbital flights to introduce travellers to micro or zero gravity. This area of activity is completely private”.

<sup>6</sup> Stephanie D. Veech, ‘To Infinity and beyond: The History of Space Travel and the Legal Implications of Privatized Space Flight through the Lens of SpaceX’ (2019) 18(1) *Loyola Maritime Law Journal* 151, 154: “[f]ounded in 2002 by Elon Musk, SpaceX was developed with the intent to “revolutionize space technology, with the ultimate goal of enabling people to live on other planets.””

<sup>7</sup> Anél Ferreira-Snyman and Gerrit M Ferreira, ‘The Application of International Human Rights Instruments in Outer Space Settlements: Today’s Science Fiction, Tomorrow’s Reality’ (2019) 22 *Potchefstroom Electronic Law Journal* 1, 3: “Elon Musk’s SpaceX, and Blue Origin, established by Jeff Bezos, are currently the most active private enterprises involved in this endeavour”.

<sup>8</sup> Maya Yang, ‘Virgin Galactic successfully flies tourists to space for first time’ (The Guardian, 10 August 2023) <<https://www.theguardian.com/science/2023/aug/10/vigin-galactic-space-flight-vss-unity-landing>> accessed 1 September 2023.

<sup>9</sup> Stephan Hobe, ‘Legal Aspects of Space Tourism’ (2007) 86(2) *Nebraska Law Review* 439: “Broadly speaking, “space tourism” denotes any commercial activity that offers customers direct or indirect experience with space travel.”

satellite-mega constellations<sup>10</sup> and collaborates with NASA (the National Aeronautics and Space Administration, which is the United States' government Space agency) in rocket-launches.<sup>11</sup>

It is evident that Outer Space is abuzz with activity being undertaken by both State and private actors. However, the regulation of the actions of both types of actors differs at an international level. While States are subject to the obligations and restrictions of the International Space Law (ISL) framework, private actors are not subjects of international law. It is a basic principle of public international law that “corporations do not have international legal personality.”<sup>12</sup> It is outlined in the foundational instrument of the ISL framework, the 1967 Outer Space Treaty,<sup>13</sup> that “States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities”,<sup>14</sup> meaning that States bear the responsibility for the actions of these new private Space actors.

Alongside these actions of States and private actors, there is also the collaborative Artemis Mission towards the Moon lead by NASA.<sup>15</sup> In respect to this new race to the Moon,

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<sup>10</sup> Jonathan C. McDowell, ‘The Low Earth Orbit Satellite Population and Impacts of the SpaceX Starlink Constellation’ (2020) 892(2) *The Astrophysical Journal Letters* 1.

<sup>11</sup> Stephan Hobe, ‘The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of Space-Faring Nations)’ (2010) 15(3 & 4) *Uniform Law Review* 869, 871: Hobe in 2010 noted that “[i]t is only recently that President Obama has evinced interest and even issued a policy directive indicating a potential move towards more commercialisation and even privatisation of the space transportation sector in the United States. The private launching enterprise, Space X, is just one of the proponents of this new era.”

<sup>12</sup> James Crawford, *Brownlie’s Principles of Public International Law* (9<sup>th</sup> edn, Oxford University Press 2019) 111.

<sup>13</sup> Treaty on the Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (adopted 27 January 1967, entered into force 10 October 1967) 610 UNTS 205 (1967 Outer Space Treaty).

<sup>14</sup> *Ibid* art VI.

<sup>15</sup> Stacey Henderson and Melissa de Zwart, ‘Returning Humans to the Moon’ in Melissa de Zwart, Stacey Henderson, John Culton, Deborah Turnbull and Amit Srivastava (eds), *Human Uses of Outer Space: Return to the Moon* (Springer 2023) 1: “[w]ith the Artemis missions, the US and its partners plan to create the Lunar Gateway, to be followed by the landing of the first woman and next man on the Moon (NASA, 2021). The Artemis project will then form the basis of planned, sustained human missions to Mars.”

“[t]here are currently multiple space programs around the world aiming to establish permanent human habitats in outer space, including on the Moon.”<sup>16</sup> The Artemis mission seeks to return humans to the Moon, while a separate collaborative effort by Russia and China is being made to also establish human habitation on the Moon.<sup>17</sup> The alignment of these missions with the 1967 Outer Space Treaty is questionable as Article II outlines that “[o]uter 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.”<sup>18</sup> This movement of States towards to Moon, which could be considered as appropriation, is also being spear-headed in some instances by former colonial powers, a theme that underpins much activity in Outer Space. For example, the launch facilities often used by the European Space Agency (ESA) are those of France, located in its former colony of French Guiana.<sup>19</sup> In this sense, it is important to highlight that some of the new activities in Outer Space mirror old activities on-Earth.

### **1.0.2 Military Activities in Outer Space**

Among these exploratory and commercial activities in Outer Space, the prospect of weaponisation of Outer Space is also a concern. The Outer Space domain has long been militarised<sup>20</sup> and becoming a ‘theatre of warfare’, beginning through satellites providing information that could inform on-Earth conflicts. This first occurred in the 1991 Persian

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<sup>16</sup> Ibid 1.

<sup>17</sup> Ibid 1: “Russia and China have also announced their intentions to establish a permanent base on the Moon and have commenced the deployment of modules which will form part of this project”.

<sup>18</sup> 1967 Outer Space Treaty, art II.

<sup>19</sup> Peter Redfield, ‘The Half-Life of Empire in Outer Space’ (2002) 32(5/6) *Social Studies of Science* 791, 792.

<sup>20</sup> Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2018) 454: “[e]ven before Sputnik I reached outer space in 1957, there was debate whether military activities should be permitted in outer space and whether aggressive military uses should be prohibited.”

Gulf War<sup>21</sup> but is also seen in recent times in the Russia-Ukraine conflict and the use by Ukraine of the “digital lifeline”<sup>22</sup> that were SpaceX satellites, with this use subsequently being withdrawn by SpaceX so as not to be used in a Ukrainian drone strike against Russia.<sup>23</sup> As Weedon and Samson note in the 2023 Secure World Foundation Report

“[f]rom a security perspective, an increasing number of countries are looking to use space to enhance their military capabilities and national security. The growing use of, and reliance on, space for national security has also led more countries to look at developing their own counterspace capabilities that can be used to deceive, disrupt, deny, degrade, or destroy space systems.”<sup>24</sup>

This militarisation has not escalated to weaponisation, as weapons are yet not placed in Outer Space. However, tests of Space weapons, specifically direct-ascent anti-satellite weapons, have been undertaken in Space.<sup>25</sup> Space weapons can be described as “things intended to cause harm that are based in space or that have an essential element based in space”<sup>26</sup> and in the case of this research, are defined as being designed specifically with the intention of use in the Outer Space domain, but are not the only types of weapons that

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<sup>21</sup> Frank Gallegos, ‘After the Gulf War: Balancing Space Power’s Development’ in Bruce M DeBlois (ed), *Beyond the Paths of Heaven: The Emergence of Space Power Thought* (Air University Press Maxwell Air Force Base 1999) 64: “[a]rguably, space “came of age” for war fighters in the Gulf War”.

<sup>22</sup> Victoria Kim, ‘Elon Musk Acknowledges Withholding Satellite Service to Thwart Ukrainian Attack’ (The New York Times, 8 September 2023) < <https://www.nytimes.com/2023/09/08/world/europe/elon-musk-starlink-ukraine.html>> accessed 8 September 2023.

<sup>23</sup> James FitzGerald, ‘Ukraine war: Elon Musk's SpaceX firm bars Kyiv from using Starlink tech for drone control’ (BBC News, 9 February 2023) < <https://www.bbc.com/news/world-europe-64579267>> accessed 1 September 2023. See also Victoria Kim, ‘Elon Musk Acknowledges Withholding Satellite Service to Thwart Ukrainian Attack’ (The New York Times, 8 September 2023) < <https://www.nytimes.com/2023/09/08/world/europe/elon-musk-starlink-ukraine.html>> accessed 8 September 2023 where Musk’s explanation of the withdrawal of satellite use is as follows ““The obvious intent being to sink most of the Russian fleet at anchor,” he wrote on X, formerly known as Twitter. “If I had agreed to their request, then SpaceX would be explicitly complicit in a major act of war and conflict escalation.””

<sup>24</sup> Dr Brian Weedon and Victoria Samson (eds), ‘Global Counterspace Capabilities: An Open Source Assessment’ (Secure World Foundation April 2023) < [https://swfound.org/media/207567/swf\\_global\\_counterspace\\_capabilities\\_2023\\_v2.pdf](https://swfound.org/media/207567/swf_global_counterspace_capabilities_2023_v2.pdf)> accessed 12 September 2023, xvi.

<sup>25</sup> Rajeswari Pillari Rajagopalan, ‘India’s Changing Policy on Space Militarization: The Impact of China’s ASAT Test’ (2011) 10(4) *India Review* 354: “China’s anti-satellite (ASAT) test of January 2007 has brought renewed focus on space security.” With regard to India’s 2019 ASAT missile test, it was recognised in Doris Ellin Urrutia, ‘India’s Anti-Satellite Missile Test is a Big Deal. Here’s Why.’ (Space.com, 10 August 2022) < <https://www.space.com/india-anti-satellite-test-significance.html>> accessed 1 September 2023: “Indian Prime Minister Narendra Modi declared on Wednesday (March 27) that the country had pulled off an ASAT missile launch that same day.”

<sup>26</sup> Robert Preston et al., *Space Weapons, Earth Wars* (The RAND Corporation, 2002) 23.

can be used in Outer Space, as discussed below. These Space weapon tests have occurred without making Outer Space ‘weaponised’ in nature because, in relation to the Outer Space domain, weapons use can occur from Earth-to-Space, in Space and weapons can also be considered as transiting through Space.<sup>27</sup> The current tests of ‘Space weapons’ that have been witnessed to date have been by the United States, Russia, China and India<sup>28</sup> and have involved anti-satellite weapons (ASAT weapons) that have been launched from Earth-to-Space, targeted at a States’ own satellite. These are not the only weapons of concern. Co-orbital ASAT weapons could be placed in Outer Space which target objects in Space from their position in-orbit.<sup>29</sup> If the placement of weapons in Outer Space occurs, this is described as signalling “the end of the sanctuary...placing destructive weapons in space (for use against space or Earth targets) or placing weapons designed explicitly to damage objects in space. That is what constitutes the end of sanctuary and creation of the new battlefield.”<sup>30</sup>

Direct-ascent ASAT weapons, the use of which from Earth to Space has been witnessed, have been banned by many States in a moratorium on testing introduced by the United States.<sup>31</sup> The moratorium on the testing of direct-ascent ASAT weapons was introduced

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<sup>27</sup> Duncan Blake, ‘Military Strategic Use of Outer Space’ in Hitoshi Nasu and Robert McLaughlin (eds), *New Technologies and the Law of Armed Conflict* (Asser Press 2014) 108: “Weapons ‘in’ Space”; 109: “Weapons ‘to’ Space”; 110: “Weapons ‘through’ Space”.

<sup>28</sup> Jinyuan Su, ‘The Legal Challenge of Arms Control in Space’ in Cassandra Steer and Matthew Hersch (eds), *War and Peace in Outer Space: Law, Policy, and Ethics* (Oxford University Press 2021) 181: “[t]he pursuit of ASATs, by both the United States and the former Soviet Union, can be traced back to the Cold War...In the last two decades, China and India have joined in the elite club of States with this capability.”

<sup>29</sup> Duncan Blake, ‘Military Strategic Use of Outer Space’ in Hitoshi Nasu and Robert McLaughlin (eds), *New Technologies and the Law of Armed Conflict* (Asser Press 2014) 108.

<sup>30</sup> Rafał Kopeć, ‘Space Deterrence: In Search of a ‘Magical Formula’ (2019) 47 *Space Policy* 121, 123.

<sup>31</sup> Heather Foye and Gabriela Rosa Hernández, ‘UN First Committee Calls for ASAT Test Ban’ (Arms Control Association, December 2022) <[6](https://www.armscontrol.org/act/2022-12/news/un-first-committee-calls-asat-test-ban#:~:text=The%20United%20States%20launched%20its,of%20debris%20to%20litter%20space.> accessed 3 September 2023: “The United States launched its ASAT testing ban initiative following a Russian test in November 2021”.</a></p></div><div data-bbox=)

by the United States' Biden Administration in 2022<sup>32</sup> and many States have agreed to its conditions, most recently European Union States in August 2023.<sup>33</sup> This is not the only instrument of weapons regulation targeted towards Space weapons. In the ISL framework, Article IV of the previously-mentioned 1967 Outer Space Treaty<sup>34</sup> prohibits the placement of nuclear weapons and weapons of mass destruction in orbit in Outer Space, as well as prevents their stationing on celestial bodies.<sup>35</sup> The inclusion of this weapons prohibition in an ISL instrument is illustrative of the concerns that existed with regards to weapons use in Outer Space during the infancy of human activity in Outer Space. This concern has still not been comprehensively dealt with in ISL, with West and Vyse noting that “[e]fforts to prevent the escalation of conflict and the use or placement of weapons in space are longstanding but remain incomplete”<sup>36</sup> in ISL. An example is Russia and China’s proposed draft Treaty on the Prohibition of the Placement and the Threat or Use

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<sup>32</sup> Sandra Erwin, ‘U.S. declares ban on anti-satellite missile tests, calls for other nations to join’ (*Space News*, 18 April 2022) < <https://spacenews.com/u-s-declares-ban-on-anti-satellite-missile-tests-calls-for-other-nations-to-join/>> accessed 26 September 2023.

<sup>33</sup> Theresa Hitchens, ‘EU embraces Biden administration’s limited ASAT test ban as UN meeting looms’ (*Breaking Defense*, 17 August 2023) <<https://breakingdefense.com/2023/08/eu-embraces-biden-administrations-limited-asat-test-ban-as-un-meeting-looms/>> accessed 1 September 2023.

<sup>34</sup> 1967 Outer Space Treaty, art IV.

<sup>35</sup> 1967 Outer Space Treaty, art IV: “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.

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.”

<sup>36</sup> Jessica West and Lauren Vyse, ‘Ploughshares Report Arms Control in Outer Space: Status, Timeline and Analysis’ (Project Ploughshares, March 2022) < [https://uploads-ssl.webflow.com/63e066081ef50cb16a3f4157/644703880fc91ec0120d6a79\\_ArmsControlOuterSpace\\_Report.pdf](https://uploads-ssl.webflow.com/63e066081ef50cb16a3f4157/644703880fc91ec0120d6a79_ArmsControlOuterSpace_Report.pdf) > accessed 26 September 2023.

of Weapons in Outer Space, which since its proposal in 2008,<sup>37</sup> and re-drafting in 2014,<sup>38</sup> has remained as a draft due to lack of support from other States.

The prohibition in Article IV of the 1967 Outer Space Treaty<sup>39</sup> outlined above only extends to nuclear weapons and weapons of mass destruction. However, outside of the Space weapons previously mentioned, potential weapons that can be used in Outer Space are primarily conventional in nature.<sup>40</sup> While the ASAT weapons discussed were designed specifically for use in Outer Space, some weapons can be used in air and Outer Space, as well as on land. Thus, while potential areas of concern with regards to weapons regulation in IHL are technological advancements, potential space weapons may just be alterations of weapons that already exist in conventional use. An example is railguns, the testing of which gained some attention during President Reagan's administration, which can operate in Outer Space.<sup>41</sup> Railguns, often found in a States' naval military arsenal, fire projectiles at high speed.<sup>42</sup> This means that many States, including those without any Space-facing capability, could possess weapons that could be used in Outer Space in their military arsenals in the form of conventional weapons.

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<sup>37</sup> Conference on Disarmament, 'Letter Dated 12 February 2008 from the Permanent Representative of the Russian Federation and the Permanent Representative of China to the Conference of Disarmament addressed to the Secretary-General of the Conference transmitting the Russian and Chinese Texts of the Draft 'Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Other Space Objects (PPWT)' by the Russian Federation and China' (29 February 2008) CD/1839 (2008 Draft PPWT).

<sup>38</sup> Conference on Disarmament, 'Letter Dated 10 June 2014 from the Permanent Representative of the Russian Federation and the Permanent Representative of China to the Conference of Disarmament addressed to the Secretary-General of the Conference transmitting the updated Russian and Chinese Texts the Draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Other Space Objects (PPWT) by the Russian Federation and China' (10 June 2014) CD/1985 (2014 Draft PPWT).

<sup>39</sup> 1967 Outer Space Treaty, art IV.

<sup>40</sup> Gary D Solis, *The Law of Armed Conflict: International Humanitarian Law in War* (Cambridge University Press 2010) 578: it is noted that "[c]hemical, biological, and nuclear weapons are outside" what is defined as a conventional weapon. Thus, conventional weapons are those weapons that are not considered weapons of mass destruction or have those characteristics.

<sup>41</sup> Claudio Bruna, and Antonio G. Accettura (eds), *Advanced Propulsion Systems and Technologies, Today to 2020* (American Institute of Aeronautics and Astronautics 2000) 411: "[i]n the West, interest in EM railgun technology started with efforts to improve the performance of the hypervelocity light-gas guns of the 1960s and was boosted by the U.S. "Star Wars" (SDI) program initiated by President R. Reagan".

<sup>42</sup> I.R. McNab and F.C. Beach, 'Naval Railguns' (2007) 43(1) IEEE Transactions on Magnetics 463: "[c]ompared with propellant guns, railguns can fire at higher velocities".

### 1.0.3 Advantages and Dangers of Outer Space Control

As described above, Outer Space is very active, with a variety of activities on-going and it controls many States interests, even the non-Space faring States. Satellite information is relied upon for States' every-day functioning, such as internet connectivity, GPS, telecommunications, etc. This reliance by States means that “[a] country in possession of unique advanced space technology and with the will and means to use it for military purposes might achieve dominance over non-space-faring countries and otherwise impose its will.”<sup>43</sup> This ability to “hold satellites at risk...is proliferating”,<sup>44</sup> as seen with India's rise as a Space actor and the capabilities of private actors. Furthermore, States are adding an Outer Space focus to their militaries, with the Trump Administration announcing the annexation of a ‘Space Force’ to the United States’ air force in 2019.<sup>45</sup> In the same year, the North Atlantic Treaty Organisation (NATO) recognised Outer Space as one of its operational domains, alongside land, air, sea and cyber, emphasising that despite this recognition of operational domain, “NATO has no intention to put weapons in space.”<sup>46</sup> Nevertheless, Outer Space is integral to NATO's operations, including the “ability to navigate and track forces, to have robust communications, to detect missile launches and to ensure effective command and control.”<sup>47</sup> Not all Space actors are of the same opinion with regards to the status of Outer Space and current weapons use therein. For example, the United States as a Space-faring State maintains that there is no arms race in Outer Space.<sup>48</sup> This lack of consensus on the militarised nature of Outer Space can

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<sup>43</sup> Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2018) 447.

<sup>44</sup> Laura Grego, ‘The Case for Space Arms Control’ in Melissa de Zwart and Stacey Henderson (eds), *Commercial and Military Uses of Outer Space* (Springer 2021) 81.

<sup>45</sup> BBC News, ‘Space Force: Trump officially launches new US military service’ (21 December 2019) <<https://www.bbc.com/news/world-us-canada-50876429> > accessed 20 August 2023.

<sup>46</sup> NATO, ‘NATO's Approach to Space’ (23 May 2023) <[https://www.nato.int/cps/en/natohq/topics\\_175419.htm](https://www.nato.int/cps/en/natohq/topics_175419.htm)> accessed 1 September 2023.

<sup>47</sup> Ibid.

<sup>48</sup> Laura Grego, ‘The Case for Space Arms Control’ in Melissa de Zwart and Stacey Henderson (eds) *Commercial and Military Uses of Outer Space* (Springer 2021) 89: “[t]he United States has stated that it does not believe there is an arms race in space and see little value in this treaty” in reference to the draft Treaty on the Prevention of the Placement or the Threat or Use of Weapons in Outer Space.

increase tensions between States and also contributes to the lack of progress in addressing the situation.

Outer Space is thus over-crowded with State and private actor exploratory and commercial activity, satellites and space-debris, alongside the potential weapons which could be placed in orbit there. Alongside growing tensions, there is the view that Outer Space is the ultimate ‘high ground’, in which “[u]nimpeded access to outer space and unrestricted freedom to use outer space and celestial bodies provide a tempting opportunity for a technologically advanced country to seize control of outer space and deny freedom of use to other countries that stand in its way.”<sup>49</sup> In this way, control over Outer Space, exercised by weapons use, could ultimately facilitate control over other States’ satellites, access to the Moon as envisioned for the future by the Artemis mission, as well as the possibility to hold Earth hostage with the threat of weapons use.

The attainment of this ultimate military high-ground illustrates the greatest dangers that could be posed to humankind as a result of weapons use in Outer Space. Even on a minimal scale, unregulated weapons use could pose significant dangers, as highlighted by Byres and Boley, who note that “ASAT weapons are now regarded as a major threat to the exploration and use of Space, including the communications and Earth-imaging provided by military satellites.”<sup>50</sup> The use of weapons in Outer Space could potentially cause damage to humankind and the Earth in various ways. For example, States’ satellites could be damaged and debris resulting from weapons use could fall to Earth (with space debris consisting of “all man-made objects in orbit about the Earth which no longer serve a useful purpose”).<sup>51</sup> Another dangerous consequence of weapons use in Outer Space is

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<sup>49</sup> Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2018) 447.

<sup>50</sup> Michael Byres and Aaron Boley, *Who Owns Outer Space? International Law, Astrophysics, and the Sustainable Development of Outer Space* (Cambridge University Press 2023) 303.

<sup>51</sup> Loretta Hall, ‘The History of Space Debris’ (Space Traffic Management Conference, Daytona Beach, November 2014) <<https://commons.erau.edu/cgi/viewcontent.cgi?article=1000&context=stm> > accessed 8 September 2023.

triggering the Kessler Syndrome, a phenomenon that is unique to this environment. The result of orbiting Space debris, the Kessler Syndrome is described as “a situation in which the number of space debris reaches some critical mass and will self-replicate by mutual interaction and fragmentation even without further launches”,<sup>52</sup> causing collision after collision in orbit which could be triggered by weapons use in Outer Space. The movement of all objects in Outer Space in orbits and the ensuing consequence on humankind is a unique element of Outer Space that must be considered in weapons use. In addition, as discussed with regards to the Artemis mission<sup>53</sup> and private actors’ Space tourism endeavours,<sup>54</sup> more humans will be introduced into the Outer Space environment. These humans will constitute civilians if an armed conflict occurs in Outer Space and could be at risk from unregulated weapons use. This prospect grows closer to a reality as more States establish themselves as Space actors, such as India, and competition for the control and power that Outer Space offers increases.

#### **1.0.4 Application of IHL to Outer Space**

If an armed conflict breaks out in Outer Space, which could involve weapons use, it is IHL that applies. Art III of the 1967 Outer Space Treaty provides that international law applies in Outer Space,<sup>55</sup> which means that IHL, as a branch of international law, applies in Outer Space. Thus, should an armed conflict occur in Outer Space, the weapons used

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<sup>52</sup> Bohumil Doboš and Jakub Pražák, ‘Master spoiler: a strategic value of Kessler Syndrome’ (2022) 22(1) *Defence Studies* 123.

<sup>53</sup> Stacey Henderson and Melissa de Zwart, ‘Returning Humans to the Moon’ in Melissa de Zwart, Stacey Henderson, John Culton, Deborah Turnbull and Amit Srivastava (eds), *Human Uses of Outer Space: Return to the Moon* (Springer 2023) 1: “[w]ith the Artemis missions, the US and its partners plan to create the Lunar Gateway, to be followed by the landing of the first woman and next man on the Moon”.

<sup>54</sup> Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2018) 227: “[f]ormed in 2004, in that very year, Virgin Galactic performed two successful experimental flights...The company is building passenger spacecraft and is ready to engage in the space tourism business. Blue Origin is another space tourism business with a spacecraft being prepared to start flights in 2018. SpaceX is preparing to transport passengers into outer space.”

<sup>55</sup> 1967 Outer Space Treaty, art III.

during the armed conflict will be subject to the existing IHL regulatory instruments, which are discussed in Chapter 4 of this thesis. However, while some of the weapons regulation instruments refer to the Outer Space environment,<sup>56</sup> they are not specifically tailored to Space weapons as discussed earlier.

The IHL framework is made up of legal instruments and customary IHL. However, this framework is also underpinned by four principles which outline the essential tenets of the regulation of armed conflict<sup>57</sup> and which provide “guidelines in unforeseen cases”.<sup>58</sup> These principles are those of humanity, military necessity, distinction and proportionality. Proportionality involves only using as much force as is necessary to achieve a military aim.<sup>59</sup> Distinction requires parties to an armed conflict to distinguish between civilians and combatants.<sup>60</sup> Military necessity requires that the aims that a party to an armed conflict seeks to achieve are only those which give the party a military advantage<sup>61</sup> – anything in excess of this is causing unnecessary harm or destruction. Finally, the “capstone”<sup>62</sup> principle from which all of the other principles stem is that of humanity. The principle of humanity encapsulates the role of IHL as a whole in times of armed conflict requiring the protection of those who are not actively participating in hostilities and also

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<sup>56</sup> Convention on the prohibition of military or any hostile use of environmental modification techniques (adopted 10 December 1976, entered into force 5 October 1978) UN, A/Res./31/72 (1976 ENMOD Convention).

<sup>57</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 42: “the fundamental principles of the law of armed conflict, from which all the substantive rules of the IHL are derived.”

<sup>58</sup> Jean Pictet, *Development and Principles of International Humanitarian Law* (Martinus Nijhoff Publishers 1985) 59-60.

<sup>59</sup> Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (adopted 8 June 1977, entered into force 7 December 1978) 1125 UNTS 3 (1977 Additional Protocol I) art 51(5)(b).

<sup>60</sup> *Ibid* art 54.

<sup>61</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 46: “[t]he principle of military necessity is not outlined in the Geneva Conventions or API but the essence of the principle finds expression in the rule on proportionality”. It was first codified in General Orders No 100: Instructions for the Government of Armies of the United States in the Field (adopted 24 April 1863) (1863 Lieber Code) art 14.

<sup>62</sup> Ryan J. Vogel, ‘Drone Warfare and the Law of Armed Conflict’ (2010) 39(1) *Denver Journal of International Law and Policy* 101, 127.

seeking to reduce the unnecessary suffering and superfluous injury caused during armed conflicts. It is this principle that forms the lens for this research.

#### **1.0.4.1 Principle of Humanity**

As Chapter 2 discusses, there are many interpretations of ‘humanity’. It is noted above that one of the aims of the principle of humanity in IHL is requiring protection for those not actively participating in hostilities. As this research focuses on the regulation of the use of weapons, it is the role of principle of humanity in weapons regulation in IHL that will be the focus. This role is to limit the means and methods of warfare that parties to an armed conflict can use during the conduct of hostilities and to prevent or reduce as much as possible unnecessary suffering and superfluous injury in armed conflict situations. Humanity is integral to weapons regulation, with its limitation on unnecessary suffering and superfluous injury being recognised as that which “underpins the majority of the weapons treaties”.<sup>63</sup> Limiting the weapons that can be used in armed conflict is a way “to ‘humanise’ the conduct of war”,<sup>64</sup> by not allowing the use of weapons that achieve a military aim but cause excessive suffering in doing so. The principle can be described as an attempt to hold armed conflict to a “moral standard”,<sup>65</sup> which is arguably the aim of all of IHL. As Chapter 2 discusses, ‘humanity’ can also reference humankind, and as previously discussed, the use of weapons in Outer Space poses many risks to humankind as a whole. As the principle of humanity is the foundation of all IHL, including weapons

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<sup>63</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 47.

<sup>64</sup> Nicholas Tsagourias and Alasdair Morrison, *International Humanitarian Law: Cases, Materials and Commentary* (Cambridge University Press 2018) 39.

<sup>65</sup> Human Rights Watch, ‘Heed the Call: A Moral and Legal Imperative to Ban Killer Robots’ (21 August 2018) <<https://www.hrw.org/report/2018/08/21/heed-call/moral-and-legal-imperative-ban-killer-robots>> accessed 26 September 2023.

regulation, it is the logical starting point from which to form recommendations for the regulation of weapons in Outer Space.

The principle of humanity also has the role of providing a minimum standard of protection in instances not expressly dealt with in the IHL framework, as it has been enshrined in this role in the Martens Clause since 1899 Hague Convention II.<sup>66</sup> This clause provides that “until a more complete code of the laws of war”<sup>67</sup> is formed, “the laws of humanity”<sup>68</sup> apply. Therefore, the principle of humanity applies in the existing gap with regard to weapons use in Outer Space, where only nuclear weapons and weapons of mass destruction are prohibited. While the International Court of Justice (ICJ) recognised the Martens Clause as “an effective means of addressing the rapid evolution of military technology”,<sup>69</sup> it cannot of itself prohibit the use of a weapon, with Meron noting that “the Martens Clause does not allow one to build castles of sand”.<sup>70</sup> Thus, while the principle of humanity as enshrined in the Martens Clause is currently providing a minimum standard of protection in the gap of weapons use in Outer Space, this research aims to form recommendations for regulation from this principle. The principle’s aim to reduce unnecessary suffering and superfluous injury is a central concern in ensuring the humane treatment of humankind should an armed conflict, and with it weapons use, occur in Outer Space.

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<sup>66</sup> Convention (II) with Respect to the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land (signed 29 July 1899, entered into force 4 September 1990) (1899 Hague Convention II) preamble.

<sup>67</sup> Ibid.

<sup>68</sup> Ibid.

<sup>69</sup> *Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons*, ICJ Reports 1996, para 78.

<sup>70</sup> Theodor Meron, ‘The Martens Clause, Principles of Humanity, and Dictates of Public Conscience’ (2000) 94(1) *The American Journal of International Law* 78, 88.

### **1.0.5 Why is this research important?**

This research's focus on investigating the gap in the current legal regime on weapons use in Outer Space and forming recommendations to address this gap is important because, as discussed above, a party who gains control over Outer Space in an armed conflict, gains control over Earth. This could pose significant risk to humankind if one State, or Space actor, gains control over the ultimate 'high ground' that is Outer Space and possesses the weapons capabilities to be able to do so. The sparse nature of existing weapons regulation for Outer Space does not mitigate against this possibility. It is for this reason that this research seeks to form recommendations for regulation which could address this gap and address the risks that currently exist.

### **1.1 Research Questions**

This research has one central research question. In order to answer this research question, three linked sub-questions are outlined as follows:

**How can the principle of humanity, a recognised key principle of IHL, be utilised to form recommendations for the regulation of the use of weapons in Outer Space?**

1. What is the current legal regime for the regulation of weapons in Outer Space?
2. What is missing in the legal regime for the regulation of weapons in Outer Space?
3. What is the role of the principle of humanity in weapons regulation?

In order to answer the central research question, three sub-questions have been formed. Sub-question 1 focuses on the IHL framework, as well as any existing weapons regulation

instruments in the ISL framework. The analysis that this research undertakes to answer sub-question 1 investigates the existing legal norms in place to deal with armed conflict if it were to occur in Outer Space. This allows for the identification of trends in the formation of previous norms and identification of how and whether these norms could apply or would be adapted to the Outer Space domain. Sub-question 2 focuses on identifying the gap in this existing framework with regards to the regulation of weapons use in Outer Space. Finally, sub-question 3 focuses on the role of the principle of humanity in IHL. This allows for an examination of the centrality of the principle in weapons regulation and an analysis of why it was adopted as the lens for this research and as the foundation for its recommendations. These sub-questions serve to answer the overall question of how the principle of humanity can be used to form recommendations for the regulation of the use of weapons in Outer Space.

## **1.2 Significance of the Research**

The unique element that this research contributes to the existing state of the art is the focus on the creation of recommendations for weapons regulation through the lens of the principle of humanity in IHL. The principle of humanity<sup>71</sup> is established as being “a concept relevant to the conduct of armed conflict [which] has a long and distinguished pedigree”<sup>72</sup> and the recommendations that this research forms for the regulation of the use of weapons in Outer Space are grounded in this principle. It is recognised that “[t]he law of war principle perhaps most closely associated with international regulation of weapons and military technology is the prohibition of unnecessary suffering, or humanity

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<sup>71</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 47 – “the principle of humanity, which is also at the core of the laws of armed conflict”.

<sup>72</sup> Elliot Winter, ‘Pillars not Principles: The Status of Humanity and Military Necessity in the Law of Armed Conflict’ (2020) 25 *Journal of Conflict & Security Law* 1, 10.

as it is also known.”<sup>73</sup> This illustrates that this principle is the basis for weapons regulation instruments.

The principle of humanity, according to Pictet, also constitutes “an embodiment of the idea which was born in the mind of Henry Dunant when he saw the thousands of wounded lying uncared-for on the battlefield of Solferino— an idea which within so few years was to conquer the world.”<sup>74</sup> As Chapter 2 discusses, interpretations of ‘humanity’ can also include humankind, as previously mentioned, but also ‘humane’ in the sense of treating other humans with a certain amount of respect and morality. This interpretation could be linked to the reduction of unnecessary suffering and superfluous injury in order to conduct war more humanely. This reason to reduce unnecessary suffering is “[o]ut of respect for human personality, which centuries of civilization have gone to create. That end to unnecessary hardships, that respect for human personality, which even war can no longer ignore, represented such a victory for humanity”.<sup>75</sup> Regulating the use of weapons out of respect for humans, and for humankind, is essential to the recommendations of the regulation of the use of weapons in Outer Space that this research forms. As previously mentioned, the use of weapons in Outer Space would impact humankind significantly and respect for the future safety and security of humankind from unnecessary suffering and superfluous injury is an important consideration in the principle of humanity.

In addition, this research is also significant in both IHL and ISL at present because there is a considerable gap in the IHL and ISL frameworks with regard to regulating weapons in Outer Space and regulation attempts to-date have failed. Thus, the recommendations that this research will form address this gap from the perspective of the principle of

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<sup>73</sup> Sean Watts, ‘Regulation-Tolerant Weapons, Regulation-Resistant Weapons and the Law of War’ (2015) 91 *International Law Studies* 540, 545-546.

<sup>74</sup> Jean S. Pictet et al (ed), *The Geneva Conventions of 12 August 1949. I: Geneva Convention I for the amelioration of the condition of the wounded and sick in armed forces in the field: Commentary* (ICRC 1952) 19.

<sup>75</sup> *Ibid* 20.

humanity. This research introduces to the existing discussion on weapons use in Outer Space the perspective at the foundation of IHL – that of the principle of humanity. This is important as this discussion grows more prevalent as the prospect of weapons use in Outer Space grows closer to becoming reality.

The placement of limits on the means and methods of warfare and the reduction of unnecessary suffering are central to IHL and particularly to weapons regulation. It is for this reason that the principle of humanity forms the lens for this research – ensuring that recommendations for regulation are arising from the foundation of the IHL framework, as will be discussed in more depth in Chapter 2.

### **1.3 Research Methodology**

The research methodology employed for this research is that of a descriptive-normative analysis. Descriptive-normative analysis involves researching and describing the current legal framework, with a view to using this descriptive analysis as the foundation for the formation of recommendations for future legal norms. Hutchinson notes that “[h]istorically, doctrinal analysis has been the dominant legal method in the common law world”.<sup>76</sup> The descriptive analysis of this research is carried out similarly to that of doctrinal legal analysis. Doctrinal research is defined by Taekema as “the systematic study of legal norms in the various sources of law that form the basis of particular legal systems”.<sup>77</sup> In this research, this involves the study and research of the relevant branches

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<sup>76</sup> Terry Hutchinson, ‘The Doctrinal Method: Incorporating Interdisciplinary Methods in Reforming the Law’ (2015) 8(3) *Erasmus Law Review* 130, 131.

<sup>77</sup> Sanne Taekema, ‘Methodologies of Rule of Law Research: Why Legal Philosophy Needs Empirical and Doctrinal Scholarship’ (2021) 40(1) *Law & Philosophy* 33, 45. See also Terry Hutchinson, ‘The Doctrinal Method: Incorporating Interdisciplinary Methods in Reforming the Law’ (2015) 8(3) *Erasmus Law Review* 130, 131: “legal academic success has been measured within a doctrinal methodology framework, which includes the tracing of legal precedent and legislative interpretation”; Emerson H. Tiller & Frank B. Cross, ‘What Is Legal Doctrine’ (2006) 100(1) *Northwestern University Law Review* 517, 518: “[t]he classical form of legal scholarship was doctrinal analysis, in which a researcher examined the content of a legal opinion to evaluate whether it was effectively reasoned or to explore its implications for future cases”.

of international law, specifically the IHL and ISL frameworks.<sup>78</sup> An important characteristic of doctrinal research that is integrated into the descriptive element of the methodology being used to carry out this research is “its attention to detail”.<sup>79</sup> The more detailed the descriptive analysis of the legal frameworks, the more in-depth the normative analysis and thus, the more relevant the recommendations for regulation will be in placing limitations on the current-day use of weapons in Outer Space. The detail of the description is essential in providing “important grounding”<sup>80</sup> in the current legal framework when forming recommendations.

With regards to the normative recommendations to be formed based on the descriptive analysis, it is noted that “[i]n doctrinal legal scholarship, normativity is part of the subject matter to be described accurately and systematically, but it is also the core of the arguments doctrinal scholars make.”<sup>81</sup> Thus, the descriptive analysis of this research will look at the existing legal norms of IHL and ISL and in doing so, will inform the recommendations for future norms that will be outlined in Chapter 7.

The descriptive-normative methodology was chosen for this research because a detailed descriptive analysis of the existing legal framework(s) involving “a combination of describing, interpreting, and arguing about legal norms and institutions”<sup>82</sup> as they currently exist in the IHL and ISL frameworks would provide the foundation for the formation of recommendations for the regulation of weapons use in Outer Space. Descriptive analysis outlines the current role of the principle of humanity in IHL and

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<sup>78</sup> Terry Hutchinson, 'Valé Bunny Watson: Law Librarians, Law Libraries, and Legal Research in the Post-Internet Era' (2014) 106(4) *Law Library Journal* 579, 584: “[i]n the method, the essential features of doctrinal research involve a critical conceptual analysis of all relevant legislation and case law to reveal a statement of the law relevant to the matter under investigation.”

<sup>79</sup> Sanne Taekema, 'Methodologies of Rule of Law Research: Why Legal Philosophy Needs Empirical and Doctrinal Scholarship' (2021) 40(1) *Law & Philosophy* 33, 45.

<sup>80</sup> Rónán Kennedy, 'Doctrinal Analysis: The Real 'Law in Action' in Laura Cahillane and Jennifer Scheppe (eds), *Legal Research Methods: Principles and Practicalities* (Clarus Press 2016) 37.

<sup>81</sup> Sanne Taekema, 'Methodologies of Rule of Law Research: Why Legal Philosophy Needs Empirical and Doctrinal Scholarship' (2021) 40(1) *Law & Philosophy* 33, 46.

<sup>82</sup> *Ibid* 45-46.

specifically in weapons regulation, as well as describing the current ISL framework and weapons regulation attempts therein. These details will “not only used for description but also as a source of normative argument.”<sup>83</sup> All of this analysis will inform how the principle of humanity can be utilised to help to form recommendations for weapons regulation in Outer Space and thus, effectively answer the central research question.

As “[l]aw and society are not two distinct spheres of study”,<sup>84</sup> this research addresses some socio-legal content, such as the political forces at play in the field of weapons regulation in Chapter 4 and the development of Outer Space into a ‘theatre of warfare’ as discussed in Chapter 6. Langbroek *et al* note that legal scholars are required to know “about the quickly changing societal, political, economic and technological contexts”.<sup>85</sup> Thus, knowledge of these constantly-changing elements, particularly in a field with as much activity as that of Outer Space and the associated legal frameworks is taken into consideration in the research but does not alter the approach of a descriptive-normative methodology. This is because, as Hutchinson notes, “[i]nterdisciplinary legal articles...frequently acknowledge the 'black letter' or 'doctrinal core' of law as the starting point”<sup>86</sup> and it is this doctrinal approach in the descriptive analysis which forms the basis for this research.

#### **1.4 Thesis Structure**

In order to answer the central research question and sub-questions outlined in Section 1.2, the research of this thesis adopts a structure of seven chapters. Chapter 2 investigates the

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<sup>83</sup> Ibid 46.

<sup>84</sup> Rónán Kennedy, ‘Doctrinal Analysis: The Real ‘Law in Action’ in Laura Cahillane and Jennifer Scheppe (eds), *Legal Research Methods: Principles and Practicalities* (Clarus Press 2016) 37.

<sup>85</sup> Philip Langbroek, Kees Van den Bos, Marc Simon Thomas, Michael Milo and Wibo Van Rossum, ‘Methodology of Legal Research: Challenges and Opportunities’ (2017) 13(3) *Utrecht Law Review* 1.

<sup>86</sup> Terry Hutchinson, ‘The Doctrinal Method: Incorporating Interdisciplinary Methods in Reforming the Law’ (2015) 8(3) *Erasmus Law Review* 130, 133.

principle of humanity, from the varying interpretations of ‘humanity’ to the principle’s historical antecedents to its current role, independently and as enshrined in the Martens Clause. This analysis assists in answering the third research sub-question, as do the analyses of Chapter 3 and Chapter 4. These Chapters identify the aims and the functions of the IHL framework and thereafter, the role of weapons regulation in IHL, which similarly helps to illustrate the role of the principle of humanity in weapons regulation. Chapters 3 and 4 also investigate the role of soft law instruments alongside the binding instruments of the IHL framework. This investigation informs the understanding of current soft-law efforts in the field of weapons regulation, as well as provides essential context regarding the legal approach that should be adopted for a future instrument. The first three chapters collectively analyse and establish the knowledge base of IHL required for the formation of recommendations for an instrument to be placed within this legal framework.

Chapter 5 outlines the ISL framework, including the core weapons-related Article IV of the foundational 1967 Outer Space Treaty<sup>87</sup> and the Outer Space-specific weapons regulation instruments currently in existence. The analysis of this Chapter, alongside that of Chapter 4, is essential in answering the first and second research sub-questions regarding the legal regime that currently applies to the regulation of weapons in Outer Space and any gaps that exist therein. In addition, Chapter 6 describes and examines the current militarised environment of Outer Space, which is illustrative of why knowledge of the existing weapons regulation provisions that apply to Outer Space is necessary and also awareness of the gaps, which this research addresses, that exist in the legal regime.

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<sup>87</sup> 1967 Outer Space Treaty, art IV.

Finally, Chapter 7 answers the research questions by means of a number of conclusions. In addition, it provides several recommendations as to how the use of weapons in Outer Space should be regulated.

## Chapter 2: The Principle of Humanity

### 2.0 Introduction

This research asks how the principle of humanity can be used to form recommendations for the regulation of the use of weapons in Outer Space. This is done through adopting the principle of humanity as the lens for the analysis of this research. This chapter examines the significance and role of the principle of humanity as it is enshrined in IHL.

The principle of humanity is one of the four central principles of IHL. The principles of humanity, distinction, military necessity and proportionality form the basis of the IHL framework. It is the principle of humanity that forms the foundation from which the other three principles stem.<sup>1</sup> The maintenance of a standard of humanity during times of armed conflict involves protecting those who are not participating in hostilities and limiting the means and methods of warfare that can be employed in order to reduce unnecessary suffering. The principle of humanity underpins all of IHL, including the other three principles, by aiming to maintain this standard of humanity during the conduct of armed conflict situations. This foundational nature of the principle of humanity in IHL is the reason it is adopted as the lens of this research. The recommendations for the regulation of the use of weapons in Outer Space should be formed with the consideration of maintaining humanity and reducing unnecessary suffering as much as possible, with the possible victims of this suffering being humankind as a whole.

The concept of maintaining ‘humanity’ in armed conflict is broad and can be subject to different interpretations, as this chapter discusses. Some of the interpretations of

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<sup>1</sup> Ryan J. Vogel, ‘Drone Warfare and the Law of Armed Conflict’ (2010) 39(1) *Denver Journal of International Law and Policy* 101, 127-128: “[t]he principle of humanity may be understood as the capstone of the other constraining principles, requiring parties to a conflict to exercise restraint when an act would cause superfluous injury or unnecessary suffering, even if it meets the requirements of necessity, distinction, and proportionality.”

humanity, while not adopted as the definition of humanity for the purpose of this research, can nevertheless be found recognised in law and are linked to the principle of humanity as defined in IHL. For example, ‘humanity’ can be interpreted with considerations of morality and humankind as a whole. Both of these considerations are important when forming recommendations for the regulation of weapons use in a domain like Outer Space, where dangers are posed to humankind as a whole. The definition of the principle of humanity that this research adopts is rooted in IHL and view the principle of humanity as seeking to limit the means and methods of warfare that can be used during armed conflicts and seeking to reduce unnecessary suffering and superfluous injury.

As this chapter illustrates, the principle of humanity in IHL has a significant history<sup>2</sup> and has been central to the limitations placed on conduct during armed conflicts prior to its express codification of IHL in legal instruments. The historical iterations of the principle of humanity which illustrate the universal nature of the principle are examined prior to the discussion of how the principle of humanity remains entrenched in the IHL treaty law framework today by virtue of the role it is prescribed in the Martens Clause.<sup>3</sup> The continued relevance of the Martens Clause in IHL illustrates the continued relevance and centrality of the principle of humanity, consolidating its adoption as the lens of analysis for this research.

Section 2.1 traces the early limitations placed on the conduct of armed conflicts in history which are illustrative of the principle of humanity in these time periods. Section 2.2 examines the different understandings of ‘humanity’ in general and in law, focusing on

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<sup>2</sup> See Hugo Slim, ‘Sharing a Universal Ethic: The Principle of Humanity in War’ (1998) 2(4) *The International Journal of Human Rights* 28 where the principle of humanity is described as “humanitarianism’s first principle”. See also Amanda Alexander, ‘A Short History of International Humanitarian Law’ (2015) 26(1) *The European Journal of International Law* 109: “[s]ometimes, international lawyers locate international humanitarian law in a long history of codes of warfare that straddle different times and cultures”.

<sup>3</sup> 1899 Hague Convention II, preamble.

the moral interpretation and the humankind interpretations, before presenting the IHL-based definition that this research adopts. Section 2.3 outlines the formation of the Martens Clause and its impact in expressly enshrining the principle of humanity into IHL instruments. Section 2.4 then analyses the inclusion of the Martens Clause in IHL instruments, as well as in customary IHL. Section 2.5 discusses the interpretations of the Martens Clause and the principle of humanity enshrined therein due to the broad nature of both. Finally, Sections 2.6 and 2.7 outline the continued relevance and continued role of the Martens Clause and the principle of humanity respectively.

## **2.1 Historical Underpinning of the Principle of Humanity – Ancient Civilisations and Religious Teachings**

Humans have waged many armed conflicts against one another across the course of history. Many of the first armed conflicts would have occurred unrecorded, or if they were recorded in some form, these recordings went undiscovered. Thus, there is very likely a history of armed conflicts within humankind that is unknown. With this born in mind, the first known recording of a war on a monument,<sup>4</sup> in this case a stone carving, dates back to approximately 2450 BC.<sup>5</sup> The stone carving known as the “Stele of the Vultures”<sup>6</sup> memorialised a Sumerian battle.<sup>7</sup> Van Dijk-Coombes describes the battle as

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<sup>4</sup> Zainab Bahrani, *Rituals of War: The body and violence in Mesopotamia* (Zone Books 2008) 147.

<sup>5</sup> Renate Marian van Dijk-Coombes ‘Lions and winged things: A proposed reconstruction of the object on the right of the lower register of the mythological side of Eannatum’s Stele of the Vultures’ (2017) 47(2) *Die Welt des Orients* 198.

<sup>6</sup> Davide Nadali, ‘How Many Soldiers on “The Stele of the Vultures”? A Hypothetical Reconstruction’ (2014) 76 *Iraq* 141. See also Zainab Bahrani, *Rituals of War: the body and violence in Mesopotamia* (Zone Books 2008) 147: “[i]t is to date the earliest known public war monument in history”.

<sup>7</sup> *Ibid* 141: “the victory of the city of Lagash over its rival Umma for the control of the water source of the canal on the border of the two Mesopotamian cities.” Sumeria was described in Samuel Noah Kramer, *The Sumerians: Their History, Culture and Character* (The University of Chicago Press 1963) 3 as being “the land which came to be known in classical times as Babylonia, consists of the lower half of Mesopotamia, roughly identical with modern Iraq from north of Baghdad to the Persian Gulf.”

being “the city-state Lagash’s victory over its neighbour Umma in a border conflict.”<sup>8</sup> Following on from the first known monument recording of an armed conflict comes the first surviving report of a battle, which is that of the description of the Battle of Megiddo.<sup>9</sup> This battle was “fought between the Egyptians led by King Tuthmosis III and the Syrian Confederacy headed by the ruler of Kadesh”<sup>10</sup> in 1479 BC.<sup>11</sup> The report recorded of the battle resulted from the fact that “[i]t was the custom in the Egyptian armies of the Empire to keep a regular diary of the course of a campaign”.<sup>12</sup> It constitutes the earliest surviving report of a battle in history. Since these earliest of armed conflicts recorded, many more armed conflicts have occurred, which eventually resulted in the placement of limitations on the actions that could be undertaken during those times.<sup>13</sup> As is described by Gillespie,

“as long as humanity has been waging wars it has also been trying to find ways of legitimising different forms of combatants and ascribing rules to them, protecting civilians who are either inadvertently or intentionally caught up between them, and controlling the use of particular classes of weapons that may be used in times of conflict.”<sup>14</sup>

These limitations on conduct during armed conflict are investigated in this section as they are evident in ancient and early societies and religions. The research argues that limitations on actions during the conduct of hostilities that were seen during these time periods have illustrated the aims of the principle of humanity, seeking to limit unnecessary suffering. This is evidence of the centrality of the principle of humanity

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<sup>8</sup> Renate Marian van Dijk-Coombes ‘Lions and winged things: A proposed reconstruction of the object on the right of the lower register of the mythological side of Eannatum’s Stele of the Vultures’ (2017) 47(2) *Die Welt des Orients* 198.

<sup>9</sup> Raymond Oliver Faulkner, ‘The Battle of Megiddo’ (1942) 28 *The Journal of Egyptian Archaeology* 2: “Battle of Megiddo...is the first military campaign in history of which any kind of detailed account has survived.” It is noted in Amanda Alexander, ‘A Short History of International Humanitarian Law’ (2015) 26(1) *The European Journal of International Law* 109 that IHL “is imbued with a particular sense of its history...These histories help to inform the current understanding of the nature and purpose of international humanitarian law.”

<sup>10</sup> *Ibid.*

<sup>11</sup> André Geraque Kiffer, *Battle of Megiddo, April 1479 BC* (Resende 2019) 8.

<sup>12</sup> Raymond Oliver Faulkner, ‘The Battle of Megiddo’ (1942) 28 *The Journal of Egyptian Archaeology* 2.

<sup>13</sup> See Leslie C. Greene, ‘The Law of War in Historical Perspective’ (1998) 72 *International Law Studies* 39, 40: “[f]rom earliest times it had been recognized that some restraints were necessary during armed conflict.”

<sup>14</sup> Alexander Gillespie, *History of the Laws of War: Volume 2: The Customs and Laws of War with regards to Arms Control* (Hart Publishing 2011) i.

during the conduct of early hostilities in history. This evidence is central to this research as armed conflicts have witnessed limitations throughout history and thus, the principle of humanity has been central to armed conflict throughout these times. This research purports that this evidence of the historical significance of the principle of humanity makes this principle the logical lens through which to form recommendations for the use of weapons in Outer Space.

### **2.1.1 Ancient Chinese and Indian Traditions**

Solis notes that “unnecessary suffering is mentioned by inference in the epic Sanskrit poem, *Mahabharata*, in the Code of Manu, and by Sun Tzu”,<sup>15</sup> illustrating a recognition of suffering in excess during armed conflict in both Chinese and Indian traditions. The *Mahabharata* and the Code of Manu form part of the Hindu religion, while the teachings of Sun Tzu are famous as Chinese teachings on war. Both traditions include discussion of limitations to be placed on conduct during times of armed conflict, as discussed below.

#### **2.1.1.1 India**

The various Buddhist and Hindu traditions in ancient India “preached various humanitarian values which were an integral factor in the way of life in this region, and which can be identified with modern human rights and humanitarian principles.”<sup>16</sup> In Hinduism, Dharma “does not mean religion: it is the law that governs all actions”,<sup>17</sup> and within this greater law, there are laws that are representative of ancient humanitarian

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<sup>15</sup> Gary D. Solis, *The Law of Armed Conflict: International Humanitarian Law in War* (Cambridge University Press 2010) 270.

<sup>16</sup> Sanoj Rajan, ‘Principles of Laws of War in Ancient India and the Concept of Mitigating Armed Conflicts through Controlled Fights’ (2014) 5 *Journal of International Humanitarian Legal Studies* 333, 334.

<sup>17</sup> Manoj Kumar Sinha, ‘Hinduism and international humanitarian law’ (2005) 87(858) *International Review of the Red Cross* 285, 286.

ideals, such that “[t]he Hindu religion not only consists of rules encompassing the rights and duties of kings and warriors, but also provides norms of *Desa Dharma* that govern inter-State relations”.<sup>18</sup> The agreed Hindu laws of war in these relations were enshrined in “the old Indian epic Mahabharata and the Code of Manu which prohibited the killing of those who were incapable of fighting, and further prohibited the use of certain weapons”,<sup>19</sup> illustrating the limitation of unnecessary suffering. The Buddhist traditions of India also provide evidence of historical humanitarianism, with Rajan noting that “‘wars of self-defence and the peaceful resolution of disputes’ under the Buddhist teachings are classic examples”<sup>20</sup> of humanitarian values in India.

#### **2.1.1.2 China**

Sun Tzu’s ‘The Art of War’ is a seminal text in the study of armed conflict on an international scale, with Ping Li and Yang describing it as “still the most revered military treatise in the world”.<sup>21</sup> However, as a “Chinese military general”,<sup>22</sup> Sun Tzu wrote the piece focusing on the conduct of hostilities by Chinese armed forces. With regards to the time period in which it contributed to the understanding of armed conflict, but also humanity, it is understood that “by the Han dynasty (206 BC – AD 220), everyone knew of Master Sun”.<sup>23</sup> Therefore, ‘The Art of War’ pre-dated this time period. Accepting of the reality of armed conflict and outlining the strategy that armed forces could adopt therein, Sun Tzu’s work includes some concepts that can be associated with the principle

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<sup>18</sup> Ibid.

<sup>19</sup> Kietil Muiezinovic Larsen, Camilla Guldahl Cooper and Gro Nystuen, *Searching for a ‘Principle of Humanity’ in International Humanitarian Law* (Cambridge University Press 2012) 3.

<sup>20</sup> Sanoj Rajan, ‘Principles of Laws of War in Ancient India and the Concept of Mitigating Armed Conflicts through Controlled Fights’ (2014) 5 *Journal of International Humanitarian Legal Studies* 333, 334.

<sup>21</sup> Peter Ping Li and Monsol Yang, ‘How to Approach the Ancient Chinese Wisdom? A Commentary Concerning Sun Tzu’s *The Art of War*’ (2017) 13(4) *Management and Organization Review* 913.

<sup>22</sup> Ibid.

<sup>23</sup> Sun Tzu (edited, translated & with an introduction by John Minford), *The Art of War: The essential translation of the classic book of life* (Penguin Books 2003) xix.

of humanity and the reduction of unnecessary suffering in times of armed conflict. An example can be seen in the instruction that “[i]n the practical art of war, the best thing of all is to take the enemy’s country whole and intact; to shatter and destroy it is not profitable. So, too, it is better to capture an army entire than to destroy it, to capture a regiment, a detachment or a company entire than to annihilate it.”<sup>24</sup> Thus, the reduction of unnecessary destruction and with that, suffering, was included in Sun Tzu’s strategic teachings that were central to Chinese military strategy. The inclusion of limitations on certain destructive activities during armed conflicts in strategic teachings illustrates their importance to the conduct of armed conflicts. Military strategies dictate how armed conflicts play out on the battlefield and the inclusion of limitations on unnecessary destruction into strategic teachings, such as those of Sun Tzu, shows the intention for these restrictions to be implemented in practice and thus, their importance.

The inclusion of limitations on the conduct of hostilities and the reduction of unnecessary suffering are evident in ancient Indian and Chinese traditions and teachings. As Indian traditions outline, many such restrictions are incorporated into guidance on the way of life and the recognition of armed conflict’s occurrence during life. Sun Tzu’s military teachings also recognise the need for limitations to be exercised by armies on the battlefield in the practice of warfare. This research asserts that these recognitions of limitations on armed conflict and particularly unnecessary suffering evidence the centrality of the principle of humanity, the lens of this research, from ancient times. Similar recognition is demonstrated in practices in the ancient Greek and Roman empires, as the following sub-section discusses.

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<sup>24</sup> Sun Tzu (translated from the Chinese by Lionel Giles), *The Art of War* (Dover Publications Inc. 2002) 48.

## 2.1.2 Ancient Rome & Greece

With regards to the Roman Empire, it was described as being “in its formative period, a somewhat tentative and ramshackle affair, without an over-arching ethical or religious basis”.<sup>25</sup> This is evidenced by Coursier, who in describing Roman wars, highlights that distinction between combatants and civilians did not occur<sup>26</sup> and an unlimited approach to war was adopted.<sup>27</sup> However, the inspiration for change came “when certain philosophical concepts were imported from Greece (from about the second century BC).”<sup>28</sup> For example, in *Politics*, Aristotle outlines what the objective of military training should and should not be, highlighting that

“[t]he proper object of practising military training is not in order that men may enslave those who do not deserve slavery, but in order that first they may themselves avoid becoming enslaved to others; then so that they may seek suzerainty for the benefit of the subject people, but not for the sake of world-wide despotism; and thirdly to hold despotic power over those who deserve to be slaves.”<sup>29</sup>

Through the import of this and similar ideas to the Roman Empire with regards to armed conflict, it was brought to the attention of the Romans that limiting the destructiveness of warfare would serve them better. Following on from this, restrictions were placed on certain actions in armed conflict situations, including “where the use of poison on weapons or the poisoning of wells were prohibited.”<sup>30</sup> In addition, the Romans placed

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<sup>25</sup> Stephen C Neff, ‘A Short History of International Law’ in Malcolm D. Evans (ed), *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 5.

<sup>26</sup> Henri Coursier, ‘Etudes sur la formation du droit humanitaire : Les idées humanitaires et le droit romain’ (1951) 389 *International Review of the Red Cross* 370, 372 : « Aucune distinction n’existe entre belligérants et non belligérants ; les vieillards, les femmes, les enfants sont traités comme les guerriers eux-mêmes. Tous peuvent être massacrés. » (No distinction exists between belligerents and non-belligerents; the elderly, women, children are treated like soldiers themselves. All can be killed)

<sup>27</sup> *Ibid* 373 : « Ainsi donc le vaincu est frustré de tout. Religion, famille, propriété, tout lui est ravi. Rome prend tout. » (The defeated is frustrated of all. Religion, family, property, everything of his is ravaged. Rome takes all.)

<sup>28</sup> Stephen C Neff, ‘A Short History of International Law’ in Malcolm D. Evans (ed), *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 5.

<sup>29</sup> Aristotle (translated by H. Rackham) *Politics* (Harvard University Press 1932) VII, XIII, ss 14 – 15.

<sup>30</sup> Kjetil Muiezinovic Larsen, Camilla Guldahl Cooper and Gro Nystuen, *Searching for a ‘Principle of Humanity’ in International Humanitarian Law* (Cambridge University Press 2012) 3. See also Henri Coursier, ‘Etudes sur la formation du droit humanitaire : Les idées humanitaires et le droit romain’ (1951) 389 *International Review of the Red Cross* 370, 382 : « [c]ertaines pratiques déloyales sont réprochées, par

limitations on “barbarism, and condemned all acts of treachery”.<sup>31</sup> These limitations that were eventually introduced into the Roman Empire’s conflicts again illustrate limitations that serve to reduce unnecessary suffering.

### **2.1.3 Early Religious Teachings on Armed Conflict**

Following on from restrictions placed on the conduct of armed conflict, religions also highlights certain limitations on wars. With regards to international law generally, Neff notes that “[w]ith the advent of the great universal religions, far more broadly based systems of world order became possible.”<sup>32</sup> Religions offered teachings which shed light on what actions were deemed permissible in times of armed conflict, such as those seen in Christianity and Islam.

#### **2.1.3.1 Christianity**

Reference to war is seen clearly in the Bible in the Old Testament. For example, acts of total war (i.e., war carried out without restriction) were permissible in wars commanded by and for God. This is evident in Deuteronomy, wherein it is outlined that when besieging towns and villages which have not surrendered, “[y]ou may enjoy the spoil of your enemies, which the LORD your God has given you.”<sup>33</sup> However, there are also instances in which limitation on unnecessary suffering in times of armed conflict were visible, such as “in the Old Testament, where the prophet Elisha told the king of Israel

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exemple on blâme l’empoisonnement des sources et des fontaines » (certain disloyal practices are condemned, for example it is criticised to poison springs and fountains).

<sup>31</sup> Coleman Phillipson, *The International Law and Custom of Ancient Greece and Rome* (Macmillan & Co 1911) 227, 228-229.

<sup>32</sup> Stephen C Neff, ‘A Short History of International Law’ in Malcolm D. Evans (ed), *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 5.

<sup>33</sup> Deuteronomy 20: 14.

that he should not slay his prisoners”<sup>34</sup> of war, as outlined in Kings 2.<sup>35</sup> In contrast, Houlihan notes how “[t]he New Testament is sparse in its references to war and related matters.”<sup>36</sup> For example, Jesus told his disciples that “[y]ou have heard that it was said, ‘An eye for an eye and a tooth for a tooth’. But I say to you, Do not resist an evildoer. But if anyone strikes you on the right cheek, turn the other also”.<sup>37</sup> This indicates that Jesus’ teachings discourage retaliation to violence. Although war is not specified, it is a contrasting teaching with respect to violence to those previously mentioned in the Old Testament and could be indicative of limitations on violence that should also be applied to armed conflict.

### 2.1.3.2 Islam

The development of the Islamic religion coincided with its own specific laws of war as the initial emergence of Islam caused much instability and with it, conflict. The sources of the Islamic law of war include “1) the Qur’an; 2) the Sunnah (tradition of the Prophet); 3) early Islamic precedents, mainly until about 661 A.D.; 4) consensus among the jurists; 5) jurists’ rulings reached through analogy; and 6) the public interest.”<sup>38</sup> These sources combined provide a specific Islamic law of war which, similar to IHL, “sought to

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<sup>34</sup> Kietil Muiezinovic Larsen, Camilla Guldahl Cooper and Gro Nystuen, *Searching for a ‘Principle of Humanity’ in International Humanitarian Law* (Cambridge University Press 2012) 3. Also see Leslie C. Green, ‘The Law of War in Historical Perspective’ (1998) 72 *International Law Studies* 39, 40: “[p]risoners of war were to be treated humanely and not slain, as Elisha informed his king when asked if he might kill them.”

<sup>35</sup> 2 Kings 6:21 – 22: “[w]hen the king of Israel saw them he said to Elisha, “Father, shall I kill them? Shall I kill them?” He answered, “No! Did you capture with your sword and your bow those whom you want to kill? Set food and water before them so that they may eat and drink; and let them go to their master.””

<sup>36</sup> James W Houlihan, *Adomán’s Lex Innocentium and the Laws of War* (Four Courts Press 2020) 29.

<sup>37</sup> Matthew 5: 38 – 39. See also Luke 6: 27 – 29: “[b]ut I say to you that listen, Love your enemies, do good to those who hate you, bless those who curse you, pray for those who abuse you. If anyone strikes you on the cheek, offer the other also”.

<sup>38</sup> Ahmed Al-Dawoody, ‘IHL and Islam: An Overview’ (Humanitarian Law and Policy Blog, 14 March 2017) <<https://blogs.icrc.org/law-and-policy/2017/03/14/ihl-islam-overview/>> accessed 26 September 2023.

humanize armed conflict”.<sup>39</sup> Thus, the principle of humanity is seen through the aspects of “protecting the lives of non-combatants, respecting the dignity of enemy combatants, and forbidding damage to an adversary’s property except when absolutely required by military necessity”.<sup>40</sup> While “the Islamic law of armed conflicts was not codified at any point in Islamic history”,<sup>41</sup> the presence of the principle of humanity in this code exemplifies the significance of this principle.

#### **2.1.4 Medieval Times**

The medieval period spanned from approximately “500 to 1500”<sup>42</sup> AD. The ‘Middle Ages’ as it is also often referred to, began after the fall of the Roman Empire<sup>43</sup> and lasted until the beginning of the Renaissance. It is noted that “[b]etween the middle of the fourth and the end of the sixth century lies a period of transition in military history”<sup>44</sup> that coincided with the move into the medieval period. In Europe during the Middle Ages, Christianity was a strong force, including in relation to armed conflict. During this period, “the distinctions between holy war, crusade and just war were difficult to draw in theory and were glossed over by those concerned to justify a particular war,”<sup>45</sup> that of the Catholic Church-supported crusades. The combatants participating in the crusades were knights, the duties of which are discussed in this section. The introduction of laws

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<sup>39</sup> Ibid.

<sup>40</sup> Ibid.

<sup>41</sup> Ibid.

<sup>42</sup> John Aberth, *An Environmental History of the Middle Ages: The Crucible of Nature* (Taylor & Francis Publishing 2012) i.

<sup>43</sup> Stephen Mitchell, *A History of the Later Roman Empire, AD 284 – 641* (John Wiley & Sons 2014) chpt 13: “The Roman Empire collapsed as a major political presence in the west by the end of the fifth century and was a much weakened presence in the east by the mid-seventh century.”

<sup>44</sup> Charles William Chadwick Oman, *The Art of War in the Middle Ages: A.D. 378 – 1515* (Cornell University Press 1953) 1.

<sup>45</sup> Frederick H. Russell, *The Just War in The Middle Ages* (Cambridge University Press 1975) 2.

outlining duties during armed conflicts was also witnessed during this time period, as is seen with regards to the *Cáin Adomnáin*.

A law, known as *Cáin Adomnáin*, was promulgated in 697 at the Synod of Birr.<sup>46</sup> This text was drafted, in the Irish language, by St Adomnán, a Christian abbot based on the Isle of Iona. The law's Latin name, *Lex Innocentium*, translated to English means 'Law of the Innocents'.<sup>47</sup> It was an "early attempt to limit the effects of war by protecting those who were not combatants, who did not bear arms: women, clergy and children"<sup>48</sup> and was founded on the reduction of unnecessary suffering in what was a constant state of "tribal violence in early medieval Ireland".<sup>49</sup> As the "text deals mainly with offences against women",<sup>50</sup> St Adomnán became known as "the defender of women and their protector against violence".<sup>51</sup> The protection of women, who are most often civilians during armed conflicts,<sup>52</sup> remains a central concern in modern IHL. Article 27 of Geneva Convention IV notes that "[w]omen shall be especially protected against any attack on their honour, in particular against rape, enforced prostitution, or any form of indecent assault."<sup>53</sup> The protection of women that St Adomnán included in *Cáin Adomnáin* is still an important aim of IHL today, which shows how universal the aim of making armed conflict more

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<sup>46</sup> Luke Moffett, 'A Bridge Too Far? Attacks against Cultural Property used as Military Objectives as War Crimes: The *Prlić et al.* Case and the Mostar Bridge' (2020) 20 International Criminal Law Review 214, 217: "[t]he 697CE Irish *Cáin Adomnáin* ('Law of Innocents') prohibited attacks against clergy and churches, imposing substantial fines on those who damage such cultural property."

<sup>47</sup> James W. Houlihan, '*Lex Innocentium* (697 AD): Adomnán of Iona – father of *Wester jus in bello*' (2019) 101(911) International Review of the Red Cross 715, 724: "[t]he law came to be known as *Cáin Adomnáin*, but it was first referred to as *Lex Innocentium*, the Law of the Innocents, a term that is found in the earliest contemporary annal reference, the *Annals of Ulster*."

<sup>48</sup> Gilbert Márkus, *Adomnán's 'Law of the Innocents': a seventh century law for the protection of non-combatants* (Blackfriars Books 1997) 6.

<sup>49</sup> Colin Smith and James Gallen, '*Cáin Adomnáin* and the Laws of War' (2014) 16 Journal of the History of International Law 63, 63-64.

<sup>50</sup> Fergus Kelly, *A Guide to Early Irish Law* (Dundalgan Press Ltd 2005) 281, appendix 1, para 74.

<sup>51</sup> Gilbert Márkus, *Adomnán's 'Law of the Innocents': a seventh century law for the protection of non-combatants* (Blackfriars Books 1997) 2.

<sup>52</sup> Judith Gardam and Hilary Charlesworth, 'Protection of Women in Armed Conflict' (2000) 22(1) Human Rights Quarterly 148, 152: "women are most likely to experience conflict as civilians".

<sup>53</sup> Geneva Convention Relative to the Protection of Civilian Persons in Time of War (signed 12 August 1949, entered into force 21 October 1950) 75 UNTS 287 (1949 Geneva Convention IV) art 27.

humane is across time. The protection that the Law of Adomnán grants to women, children and religious personnel outlines the modern civilian-combatant differentiation associated with the principle of distinction. In addition, the principle of humanity is also evident in Adomnán's enactment of this law "from his passionate concern to protect the most vulnerable people from the violence and the horrors of war."<sup>54</sup> While introduced at what is described as having been "a joint lay-ecclesiastical assembly",<sup>55</sup> it is recognised as being a legal as opposed to a religious text, constituting what would be referred to "[i]n today's terminology... a law for non-combatants."<sup>56</sup>

Medieval times also witnessed attempts to impose the fair conduct of war in "the medieval tradition of chivalry".<sup>57</sup> Meron outlines the chivalric duties undertaken by knights, who fought on the battlefield on horseback<sup>58</sup> and were "heavily armed"<sup>59</sup> and armoured. Knights were a central feature of "European military history during the Middle Ages".<sup>60</sup> The duties that knights undertook in Medieval times are outlined as follows:

"[t]he humane and noble ideals of chivalry included justice and loyalty, courage, honour and mercy, the obligations not to kill or otherwise take advantage of the vanquished enemy, and to keep one's word— sanctity of the chivalric oath was particularly important— and the duties to protect the weak, women, widows and orphans, to help people in distress, to be gentle, to act nobly and generously, to redress wrongs, to avenge injustice and to renounce the pursuit of material gain (but not the spoils of war and ransom). Dubbing of knights thus reflected merit, courage and service to the community, in accordance with these principles."<sup>61</sup>

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<sup>54</sup> Gilbert Márkus, *Adomnán's 'Law of the Innocents': a seventh century law for the protection of non-combatants* (Blackfriars Books 1997) 7.

<sup>55</sup> James W. Houlihan, *Adomnán's Lex Innocentium and the Law of War* (Four Courts Press 2020) 11.

<sup>56</sup> *Ibid.*

<sup>57</sup> Theodor Meron, 'The Humanization of Humanitarian Law' (2000) 94(2) *The American Journal of International Law* 239, 240.

<sup>58</sup> Pamela Nightingale, 'Knights and Merchants: Trade, Politics and Gentry in Late Medieval England' (2000) 169 *Past and Present* 36, 37.

<sup>59</sup> Bernard S Bachrach, 'Medieval Siege Warfare: A Reconnaissance' (1994) 58(1) *The Journal of Military History* 119, 122.

<sup>60</sup> *Ibid* 119.

<sup>61</sup> Theodor Meron, *Bloody Constraint: War and Chivalry in Shakespeare* (Oxford University Press 1998) 5.

An example of the codes of chivalry impacting behaviour during armed conflict is the “modicum of fair play”<sup>62</sup> that it establishes. Furthermore, it is recognised that “[c]hivalry’s legacy appears most clearly in the principles of modern humanitarian law.”<sup>63</sup> The codes of chivalry are illustrative of a code of conduct being imposed upon the belligerents of the time, knights, to treat each other with a level of respect and humanity during their battles. Similar to the protection of women included in the *Cáin Adomnáin* formed in the same era, knights also had duties to women, children and those not actively participating in hostilities with regards to protection. These elements of humane treatment and protection are seen in modern IHL, as Meron noted,<sup>64</sup> in instruments that are discussed in this chapter.

### **2.1.5 First Codification of the Principle of Humanity**

As discussed above, rules in medieval times applied to knights as the combatants of the time, and protections to civilians of the time, as seen in the *Cáin Adomnáin*. It is the Lieber Code, formally referred to as the 1863 General Orders, No. 100: Instructions for the Armies of the United States in the Field,<sup>65</sup> that is “commonly recognised as the first attempt to codify the laws and customs of war”,<sup>66</sup> even if only in domestic law during the United States Civil War. The principle of humanity is identifiable in Article 4 of the Lieber Code, which obliged soldiers to “be strictly guided by the principles of justice,

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<sup>62</sup> Theodor Meron, ‘The Humanization of Humanitarian Law’ (2000) 94(2) *The American Journal of International Law* 239, 240. It is also noted in René Moelker & Gerhard Kümmel, ‘Chivalry and Codes of Conduct: Can the Virtue of Chivalry Epitomize Guidelines for Interpersonal Conduct?’ (2007) 6(4) *Journal of Military Ethics* 292, 293 that the laws of chivalry applied to “the nobles and knights who, in medieval times, fought each other according to a strict set of rules. Chivalry in this sense takes on the meaning of fair play.”

<sup>63</sup> Theodor Meron, *Bloody Constraint: War and Chivalry in Shakespeare* (Oxford University Press 1998) 12.

<sup>64</sup> *Ibid.*

<sup>65</sup> 1863 Lieber Code.

<sup>66</sup> Kietil Muiezinovic Larsen, Camilla Guldaahl Cooper and Gro Nystuen, *Searching for a ‘Principle of Humanity’ in International Humanitarian Law* (Cambridge University Press 2012) 3.

honor, and humanity”.<sup>67</sup> This is one of the first laws recognised in the catalogue of modern IHL instruments and as is illustrated in Section 2.3, the majority of the IHL instruments that followed also referred to the principle of humanity, emphasising the significance of this principle to IHL.

In 1864, “the first ICRC Convention met in Geneva, a year after America’s adoption of the Lieber Code,”<sup>68</sup> with the International Committee of the Red Cross (ICRC) having been established following on from Henry Dunant’s account of the bloody aftermath of the Battle of Solferino, which he recorded in his book *A Memory of Solferino*.<sup>69</sup> The protective nature of IHL arguably began with Henry Dunant who sought to instil more humanity into the conduct of armed hostilities. What he witnessed on the battlefield inspired his need to protect those no longer actively participating in hostilities because, as noted by Solis, “[a]s was the military practice of the time, the wounded who were unable to keep up with their departing army, or who has no comrades to assist them in keeping pace, were left to their fates on the field of the battle where they had fallen.”<sup>70</sup> Dunant witnessed the aftermath of this practice and as a result, saw a need for humanity to be maintained, even in times of armed conflict, including the treatment of those who are no longer actively participating in the hostilities. It is with this aim in mind that Dunant worked towards the creation of the ICRC. After the first codification of IHL in the Lieber Code, the ICRC’s 1864 Geneva Convention<sup>71</sup> sought to codify requirements for the protection of the wounded in the battlefield, in order to reduce their suffering, also an early IHL instrument inspired by the principle of humanity. Dunant’s objectives for IHL

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<sup>67</sup> 1863 Lieber Code, art 4.

<sup>68</sup> Gary D. Solis, *The Law of Armed Conflict: International Humanitarian Law in War* (Cambridge University Press 2010) 48.

<sup>69</sup> Henry Dunant, *A Memory of Solferino* (American Red Cross 1939).

<sup>70</sup> Gary D. Solis, *The Law of Armed Conflict: International Humanitarian Law in War* (Cambridge University Press 2010) 47.

<sup>71</sup> Convention for the Amelioration of the Condition of the Wounded in Armies in the Field. Geneva, 22 August 1864 (adopted 22 August 1864, entered into force 22 June 1865) 75 UNTS 31 (1864 Geneva Convention).

were synonymous with the principle of humanity and highlight the centrality of this principle to the establishment of the ICRC and the first Geneva Convention. This central position of the principle of humanity in the establishment of IHL and in this case, the introduction of the instruments in the IHL framework, justifies its role as the lens of this research in forming recommendations for the regulation of the use of weapons in Outer Space.

As the history of the principle of humanity has demonstrated, it is at the core of IHL.<sup>72</sup> This ancient importance has continued into modern day IHL due, in significant part, to the Martens Clause, as is discussed in Section 2.3. Sassòli notes that this historical precedent is something that the ICRC “has made great efforts to highlight...to convince parties to contemporary conflicts and individuals involved therein to comply with IHL principles.”<sup>73</sup> The following section discusses how this research defines the principle of humanity, which provides the lens of analysis for this research.

## **2.2 ‘Humanity’ for the Purpose of this Research**

The principle of humanity in IHL is left with a vague interpretation to allow it to provide protection in many cases, which is different from the other three IHL principles with more clear definitions which are outlined in Chapter 3. The section discusses the different iterations of humanity which could be included in what the principle of humanity means. As the principle of humanity is the lens for the analysis of this research, the different interpretations of humanity that are interwoven into the understanding of the principle of

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<sup>72</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn., Cambridge University Press 2020) 47 – “the principle of humanity, which is also at the core of the laws of armed conflict”.

<sup>73</sup> Marco Sassòli and Patrick S Nagler, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar Publishing 2019) 6.

humanity will be discussed and the definition that this research is using for the principle of humanity is outlined.

‘Humanity’ can be understood in a variety of ways and the definition of the term in the Oxford English Dictionary ranges from “the quality of being humane”,<sup>74</sup> “an act of kindness”<sup>75</sup> to “the condition, quality, or fact of being human”<sup>76</sup> and “human beings collectively”.<sup>77</sup> This variation is similarly recognised with regards to academic works on humanity in International Law, with Coupland noting that

“[i]t can mean human beings collectively, but at the same time it carries notions of philanthropy and altruism. The laws of humanity and crimes against humanity are referred to in international treaties, and humanity is cited as a source of international law.”<sup>78</sup>

Teitel proposes a similarly varied description of the meaning of the term, outlining that “[h]umanity’s meaning derives in part from natural law and from shared moral commitments, and alternatively from the notion of ‘humanity’ as a collective, and from dimensions of ‘humane’ behavior.”<sup>79</sup> Here we see the translation of the various definitions of humanity in general into the legal context. The different interpretations of humanity in law are discussed in Section 2.2.2., while Section 2.2.1 discusses the various understandings of the general meaning of humanity.

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<sup>74</sup> The Oxford English Dictionary <<https://www-oed-com.may.idm.oclc.org/view/Entry/89280?redirectedFrom=humanity#eid> > accessed 26 September 2023, I. 1(a).

<sup>75</sup> Ibid I. 1(b)

<sup>76</sup> Ibid II. 3(a)

<sup>77</sup> Ibid II. 4.

<sup>78</sup> Robin Coupland, ‘Humanity: What is it and how does it influence international law?’ (2001) 83(844) *International Review of the Red Cross* 969.

<sup>79</sup> Ruti Teitel, ‘For Humanity’ (2004) 3(2) *Journal of Human Rights* 225.

### **2.2.1 Humanity – General Meaning**

The general understandings of humanity, from the perspective of referencing humankind as a whole and from that of an altruistic sense of treating others in a humane manner are outlined in this section. How these understandings of what humanity means and how they have been influenced from sources outside of the law, such as that of philosophy, is important for this research as it analyses how the principle of humanity is framed and understood more generally. These general understandings contribute to and influence how humanity is translated into law, including into IHL, which is the definition of the principle of humanity that is being adopted for this research. In discussing the general understandings of humanity, the analyses are divided into humanity as referencing all of humankind and then humanity as a sense of morality.

#### **2.2.1.1 Humanity as Referencing All of Humankind**

One interpretation is “humanity-humankind”,<sup>80</sup> which refers to the collective human population. From this perspective, ‘humanity’ is “resonant with notions of the multitude, with mankind in the collective.”<sup>81</sup> What ‘humanity-humankind’ refers to is defined by humankind ourselves, with Allott noting that “[w]e do not know that humanity has any form of existence other than as humanity conceived by and for itself.”<sup>82</sup> Therefore, it is humans who defined what made us human and what differentiated us from ‘other’ (for example, the animals) and therefore, we defined the boundaries of ‘humankind’.

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<sup>80</sup> Robin Coupland, ‘Humanity: What is it and how does it influence international law?’ (2001) 83(844) *International Review of the Red Cross* 969, 973.

<sup>81</sup> Ruti Teitel, ‘For Humanity’ (2004) 3(2) *Journal of Human Rights* 225.

<sup>82</sup> Philip Allott, ‘Reconstituting Humanity – New International Law’ (1992) 3 *European Journal of International Law* 219, 220.

What it means to be ‘human’ has been the topic of much philosophical discussion. With respect to humankind, in *De Anima* Aristotle states that reason “is present in man as a faculty only. The active operation of thought is determined by the development of this faculty.”<sup>83</sup> Thus, a human has reason but active thinking and decision-making must be undertaken in order to expand upon and inform reason. Aristotle also notes in *Politics* that “all the actions of all mankind are done with a view to what they think to be good”,<sup>84</sup> illustrating that humans will act in their own favour. This research notes that as referenced above with regard to Allot, what is in human’s favour is self-defined from their own perspective.<sup>85</sup> However, in contrast to the equality of humans that is seen to have been drawn upon by modern philosophers discussed below, Aristotle portrays an inequality through the recognition of slaves as constituting lesser humans than free humans.<sup>86</sup> Nevertheless, the divergence of opinions with respect to equality is also acknowledged by Aristotle in noting that “others however maintain that for one man to be another man’s master is contrary to nature, because it is only convention that makes the one a slave and the other a freeman and there is no difference between them by nature, and that therefore it is unjust, for it is based on force.”<sup>87</sup> Thus, Aristotle recognises humankind to be capable of acting in their own interests and by not viewing all humans as equal, Aristotle recognises that the inequality between a free human and a slave is not the way of nature, but rather that circumstances have been made that way by human intervention or force.

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<sup>83</sup> Frank Granger, ‘Aristotle’s Theory of Reason’ (1983) 2(7) *Mind* 307. See also Aristotle, *De anima*, 429a 22.

<sup>84</sup> Aristotle (translated by H. Rackham) *Politics* (Harvard University Press 1932) I, I, ss 1.

<sup>85</sup> Philip Allott, ‘Reconstituting Humanity – New International Law’ (1992) 3 *European Journal of International Law* 219, 220.

<sup>86</sup> Aristotle (translated by H. Rackham) *Politics* (Harvard University Press 1932) I, II, ss 5: “a slave is a live article of property”.

<sup>87</sup> *Ibid* I, II, ss 3.

According to Blondel, what it means to be human was envisaged by “the Greek sophists who believed that the use of reason was mankind's distinguishing feature.”<sup>88</sup> It is noted that Cicero built upon this conception when he “contrasted homo romanus with homo humanus, the cultured and moral human being. For Cicero, the contrast was no longer between Romans and Barbarians, but between humanity and inhumanity.”<sup>89</sup> Thus, Cicero believes humankind to not only be capable of use of reason but also to be able to implement this reason to act in a certain way, such as morally, which links to the concept of humanity as morality discussed in the following section.

Among the modern philosophers describing the characteristics of humans or ‘man’ as the phrasing adopts, Hobbes in 1640 describes “men by nature equal”.<sup>90</sup> Hobbes proposes that even though they are equal, “men by natural passion are divers ways offensive one to another, every man thinking well of himself, and hating to see the same in others”.<sup>91</sup> In contrast, while Locke in 1689 similarly recognises humans as being equal and free,<sup>92</sup> he notes that such natural state of freedom is restrained because “being all equal and independent, no one ought to harm another in his life, health, liberty, or possessions”.<sup>93</sup> While Locke describes a moral restraint on human’s actions towards each other, Hobbes highlights humans’ aversion to one another, which provides foundation for his contention that humankind have a natural tendency towards violence.<sup>94</sup> Hobbes concludes that

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<sup>88</sup> Jean-Luc Blondel, ‘The meaning of the word ‘humanitarian’ in relation to the Fundamental Principles of the Red Cross and the Red Crescent’ (1989) 273 *International Review of the Red Cross* 507, 514.

<sup>89</sup> *Ibid.*

<sup>90</sup> Thomas Hobbes and Ferdinand Tönnies (eds), *Elements of Law, Natural and Politic* (Cambridge University Press 1928) 53.

<sup>91</sup> *Ibid.* 54.

<sup>92</sup> John Locke and Ian Shapiro (eds), *Two Treatises of Government and a Letter Concerning Toleration* (Yale University Press 2003) 101 it is noted in the Second Treatise that men’s natural state is “a state of perfect freedom to order their actions and dispose of their possessions and persons, as they think fit, within the bounds of the law of nature” and this state is also that “of equality, wherein all the power and jurisdiction is reciprocal, no one having more than another”.

<sup>93</sup> *Ibid.* 102.

<sup>94</sup> Jean-Jacques Rousseau, ‘Discours sur l’Origine et les Fondemens de l’Inégalité parmi les Hommes’ (Collection complète des œuvres Geneve 1780-1789 1(4) online 7 october 2012) <<http://www.rousseauonline.ch/Text/discours-sur-l-origine-et-les-fondemens-de-l-inegalite-parmi-les->

“seeing then to the offensiveness of man's nature one to another, there is added a right of every man to everything, whereby one man invadeth with right, and another with right resisteth; and men live thereby in perpetual diffidence, and study how to preoccupate each other; the estate of men in this natural liberty is the estate of war.”<sup>95</sup>

Rousseau in his 1755 work disagrees with this description of the nature of humankind by Hobbes, himself noting that humans have “la pitié”<sup>96</sup> (pity), an understanding and sensitivity towards others and the treatment they receive. However, Wolff emphasises that “it is important to make clear that Rousseau’s claim that human beings are naturally motivated by pity or compassion is very different from the point we attributed to Locke”.<sup>97</sup> Unlike Locke, Rousseau does not assert that humans act in a moral fashion towards other humans but simply claims that humans “generally try to avoid harming others, not because we recognize that harm is immoral, but because we have an aversion to harm, even when it is not our own.”<sup>98</sup> While Locke and Rousseau do not support Hobbes’ view of human’s aversion towards one another which leads to conflict, the views of both with respect to humankind do eventually end in a state of conflict.<sup>99</sup> The development of the understanding of what it means to be human, and thus, how humankind is composed, informs this research. The considerations of humankind and their protection are central to this research’s aim of forming recommendations for the regulation of the use of weapons in Outer Space. Furthermore, characteristics of humans, such as respect for other humans, as is discussed in the following section with regards to

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hommes.php > accessed 22 July 2023, 49-50 described that «Hobbes prétend que l’homme est naturellement intrépide, & ne cherche qu’à attaquer & combattre. » (Hobbes pretends that man is naturally fearless and only looks to attack and fight.)

<sup>95</sup> Thomas Hobbes and Ferdinand Tönnies (ed), *Elements of Law, Natural and Politic* (Cambridge University Press 1928) 55-56.

<sup>96</sup> Jean-Jacques Rousseau, ‘Discours sur l’Origine et les Fondements de l’Inégalité parmi les Hommes’ (Collection complète des œuvres Geneve 1780-1789 1(4) online 7 octobre 2012) <<http://www.rousseauonline.ch/Text/discours-sur-l-origine-et-les-fondemens-de-l-inegalite-parmi-les-hommes.php> > accessed 22 July 2023, 74-75.

<sup>97</sup> Jonathan Wolff, *An Introduction to Political Philosophy* (3<sup>rd</sup> edn, Oxford University Press 2016) 25.

<sup>98</sup> Ibid 26.

<sup>99</sup> Ibid 32: “whatever the force of these responses to Hobbes, both Locke and Rousseau admit that the counteracting causes to war they have identified can only serve to delay the onset of severe conflict and will not avoid it forever.”

the interpretation of humanity from a moral perspective, can be linked to the IHL-rooted definition of humanity adopted by this research. Seeking to limit the suffering of humans from weapons use stems from respect for other humans. Thus, establishing what is considered as ‘human’ informs the definition of the principle of humanity, which forms the lens of this research.

Humans are theorised by the modern philosophers to inevitably end in conflict with one another. The centrality of the principle of humanity in IHL illustrates the aim of granting protection to those who require it during times when humans do engage in conflict with one another. Furthermore, despite the outcome hypothesised by modern philosophers, how humankind treats each other has informed the interpretation of humanity as a sense of morality towards one another.

### **2.2.1.2 Humanity as a Sense of Morality**

‘Humanity’ has been used to refer to a sense of morality and acting in a respectful manner towards others. As Pictet outlines, the term human “in its first sense, means all that concerns Man”,<sup>100</sup> as discussed in the previous sub-section. When elaborating upon the concept of ‘humanity’, Pictet notes that this presupposes that referring to man or human,<sup>101</sup> “denotes a man who is good to his fellow beings.”<sup>102</sup> Thus, the interpretation of the term humanity being “the sentiment or attitude of someone who shows himself to

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<sup>100</sup> Jean Pictet, ‘The Principles of International Humanitarian Law’ (1966) 66 *International Review of the Red Cross* 455, 459.

<sup>101</sup> Much legal language is gendered, with use of ‘man’ as opposed to ‘human’. There have been attempts to reduce gendered language, particularly in IHL, such as United Nations Security Council Resolution 1325, ‘Resolution on Women and Peace and Security’ (October 2000) S/RES/1325 which aims to, as noted in Dianne Otto, ‘The Exile of Inclusion: Reflections on Gender Issues in International Law over the Last Decade’ (2009) 1(10) *Melbourne Journal of International Law* 11, 17 alter “the dominant script of women as the victims of armed conflict by acknowledging a diversity of women’s experience and giving prominence to the importance of women’s contributions to conflict resolution and sustainable peace.”

<sup>102</sup> Jean Pictet, ‘The Principles of International Humanitarian Law’ (1966) 66 *International Review of the Red Cross* 455, 459.

be human”,<sup>103</sup> stems from the idea that acting with ‘humanity’ is acting morally towards other human beings. Coupland describes this interpretation of the term as that of “humanity-sentiment”.<sup>104</sup>

As it is noted that the modern philosophers discussed with regards to human nature, Locke and Rousseau both highlight human aversion towards harming others, but as was highlighted by Wolff,<sup>105</sup> it was only Locke who associated acting humanely towards other humans as stemming from a recognition that others have a right to be treated humanely. The interpretation of humanity as a sense of morality presupposes that the members of humankind, as outlined in the previous sub-section, act fairly and morally towards their other humans. Both of these general interpretations of humanity have influenced how humanity is integrated into and interpreted in Law, as the following section discusses.

### **2.2.2 Humanity in Law**

The interpretations of humanity as referring to either humankind or a sense of morality have both become interwoven into legal frameworks and instruments. Humanity as a sense of morality and how it is identified by Locke with respect to rights that humans naturally possess is seen in natural law discourse, as the following sub-section outlines. Other instances of where the humankind and morality interpretations of humanity can be seen in the law is then discussed.

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<sup>103</sup> Ibid.

<sup>104</sup> Robin Coupland, ‘Humanity: What is it and how does it influence international law?’ (2001) 83(844) *International Review of the Red Cross* 969, 973.

<sup>105</sup> Jonathan Wolff, *An Introduction to Political Philosophy* (3<sup>rd</sup> edn., Oxford University Press 2016) 25.

### 2.2.2.1 Humanity and ‘Natural Law’

Crawford outlines that “[t]he early development of international law saw its gradual separation from natural law, a process...which ended with the Peace of Westphalia (1648).”<sup>106</sup> Natural law thus pre-dates the system of sovereign States introduced with the Peace of Westphalia and recognisable in International Law today, as did the principle of humanity in IHL.

Natural law is defined by Pictet as “all the rights which every man demands for himself and which he is at the same time prepared to accord to others”.<sup>107</sup> It is these rights that are discussed by Locke which he believes are accorded to all humans, as discussed in the previous sub-section and which are often aligned with the interpretation of humanity as a sense of morality with regards to treating others humanely or in a moral fashion as they have the same rights as all other humans.

The emergence of limitations in armed conflict, such as those outlined in Section 2.1, could be deemed to be illustrative of how “[n]atural law restraints were invoked as ‘that association which binds the human race’. Shared human bonds were somehow assumed to exist, and to derive from religion and morality, even if they were nowhere defined or codified.”<sup>108</sup> Thus, despite the lack of any formal, positive law limitations, a significant history of limitations in armed conflict situations exists, which arguably arises from a common, natural law between humans to limit the suffering inflicted upon other humans.<sup>109</sup>

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<sup>106</sup> James Crawford, *Brownlie’s Principles of Public International Law* (9<sup>th</sup> edn, Oxford University Press 2019) 7.

<sup>107</sup> Jean Pictet, ‘The Principles of International Humanitarian Law’ (1966) 66 *International Review of the Red Cross* 455, 462.

<sup>108</sup> Ruti Teitel, ‘For Humanity’ (2004) 3(2) *Journal of Human Rights* 225.

<sup>109</sup> *Ibid* 226: “[a] humanitarian sensibility emerged despite the absence of positive law.”

Coupland highlights that Grotius “was among the first to postulate that natural law provided a source of international law,”<sup>110</sup> and Pictet expands upon this in the description of natural law as “the source of all humanitarian law”.<sup>111</sup> However, the link between natural law and IHL, specifically the principle of humanity, is not the position agreed by all. This is illustrated by Coupland who notes that humanity “is currently perceived as little more than a source of international law with tenuous links to natural law”,<sup>112</sup> which, along with the diverging interpretations as to the meaning of ‘humanity’, as illustrated in this section, has resulted in humanity being “denied a place in legal dialogue.”<sup>113</sup>

However, the Martens Clause, which enshrines the principle of humanity in treaty law, and which is discussed in depth in this chapter, is also considered to have provided “a positivist basis for the incorporation of natural law concepts.”<sup>114</sup> These natural law concepts thus include the principle of humanity and the dictates of public conscience, as is outlined in Section 2.3. Ticehurst notes the utility of the Martens Clause as it “establishes an objective means of determining natural law: the dictates of the public conscience.”<sup>115</sup> However, as noted in this chapter, the principle of humanity is distinct from the dictates of public conscience and thus, it may not be the principle of humanity which enshrines natural law into positive law in the Martens Clause.

While natural law as the source of the principle of humanity is not agreed upon, the historical antecedents to express codification of the principle of humanity, as discussed

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<sup>110</sup> Robin Coupland, ‘Humanity: What is it and how does it influence international law?’ (2001) 83(844) *International Review of the Red Cross* 969, 974.

<sup>111</sup> Jean Pictet, ‘The Principles of International Humanitarian Law’ (1966) 66 *International Review of the Red Cross* 455, 462.

<sup>112</sup> Robin Coupland, ‘Humanity: What is it and how does it influence international law?’ (2001) 83(844) *International Review of the Red Cross* 969, 988.

<sup>113</sup> *Ibid.*

<sup>114</sup> Mitchell Stapleton-Coory, ‘The Enduring Legacy of the Martens Clause: Resolving the Conflict of Morality in International Humanitarian Law’ (2019) 40(2) *Adelaide Law Review* 471, 484.

<sup>115</sup> Rupert Ticehurst, ‘The Martens Clause and the Laws of Armed Conflict’ (1997) 317 *International Review of the Red Cross* < <https://www.icrc.org/en/doc/resources/documents/article/other/57jnhy.htm>> accessed 26 September 2023.

in Section 2.1, are illustrative of limitations being placed on actions during armed conflicts which limit the unnecessary suffering of other humans and with that, draw similarities with the natural law notion of rights that humans have and give to other humans. This research notes that this limitation on unnecessary suffering caused to humans aligns with the moral interpretation of treating other humans with respect and is intertwined with the principle of humanity as it is defined from an IHL perspective in this research. The presence of considerations of the principle of humanity in natural law, whether the latter was the source of the former or not, indicates the significance of the principle of humanity. It is this principle and the previously mentioned considerations associated with it that forms the lens for the formation of the regulation of the use of weapons in Outer Space in this research.

#### **2.2.2.2 Humankind and Morality Interpretations of Humanity in Law**

The use of the term ‘humanity’ to denote humankind as a whole is evident in many branches of international law, including the space law framework as is discussed in Chapter 5. This is seen through reference to mankind, such as granting Outer Space the status of the province of mankind<sup>116</sup> and the Moon the status of common heritage of

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<sup>116</sup> 1967 Outer Space Treaty, art I.

mankind.<sup>117</sup> While the term ‘mankind’ is used in the UN space law framework,<sup>118</sup> this research uses the gender-neutral term ‘humankind’ to refer to humans collectively.

The humankind interpretation of humanity is also seen in international criminal law with regards to crimes against humanity as provided for in the Rome Statute of the International Criminal Court.<sup>119</sup> Both interpretations of humankind and of a sense of morality can be seen to be included in this instance as it is described that “[c]rimes against humanity...are crimes against humanity-humankind carried out by acts of inhumanity.”<sup>120</sup> In the preamble of the Rome Statute, it is recognised that previous international crimes were “unimaginable atrocities that deeply shock the conscience of humanity”,<sup>121</sup> referring to the collective conscience of humankind as a whole. The commission of such crimes constitutes the antithesis of the sense of morality interpretation of humanity and Coupland highlights that in direct contrast to the humanity-

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<sup>117</sup> See The Antarctic Treaty (signed 1 December 1959, entered into force 23 June 1961) 402 UNTS 71 (1959 Antarctic Treaty) preamble wherein the reference that “in the interest of all mankind shall continue forever to be used exclusively for peaceful purposes” has been submitted to represent the recognition of Antarctica as the common heritage of mankind. See also UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (adopted 16 November 1972, entered into force 17 December 1975) (1972 UNESCO Convention) preamble: “parts of the cultural or natural heritage are of outstanding interest and therefore need to be preserved as part of the world heritage of mankind as a whole”. See also Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (concluded 5 December 1979, entered into force 11 July 1984) UNTS vol. 1363, p. 3 (1979 Moon Agreement) art 11(1): “[t]he moon and its natural resources are the common heritage of mankind”. However, this agreement is recognised as being “widely rejected” by Adam G Quinn, ‘The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space’ (2008) 63 *Minnesota Journal of International Law* 475, 479. See also United Nations Convention on the Law of the Sea (published 10 December 1982, entered into force 16 November 1994) (1982 UN Convention on the Law of the Sea) preamble: “area of the sea-bed and ocean floor and the subsoil thereof, beyond the limits of national jurisdiction, as well as its resources, are the common heritage of mankind”.

<sup>118</sup> See 1967 Outer Space Treaty, art I: “[t]he 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, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.” See also 1979 Moon Agreement, art 11: “[t]he moon and its natural resources are the common heritage of mankind”.

<sup>119</sup> Rome Statute of the International Criminal Court (adopted 17 July 1998, last amended 2010) ISBN No. 92-9227-227-6 (1998 Rome Statute of the International Criminal Court) art 7.

<sup>120</sup> Robin Coupland, ‘Humanity: What is it and how does it influence international law?’ (2001) 83(844) *International Review of the Red Cross* 969, 978.

<sup>121</sup> 1998 Rome Statute of the International Criminal Court, preamble.

sentiment understanding of ‘humanity’, there is inhumanity.<sup>122</sup> The regulation of acts of inhumanity is often linked to the role of IHL, with Teitel noting that:

“[t]o some extent the meaning of humanity lies not in aspiration but on its underside, in the practices reflecting the degradation of the human, ‘man’s inhumanity to man’. This understanding is customarily revealed by practices stuck in the crucible of conflict”.<sup>123</sup>

The inclination to regulate acts of inhumanity is often rooted in what Glover describes as “moral resources”,<sup>124</sup> described as “certain human needs and psychological tendencies which work against narrowly selfish behaviour.”<sup>125</sup> These ‘moral resources’ include having respect and sympathy towards other humans. However, not everyone possesses these resources, leading to inhumanity.<sup>126</sup> The integration of humanity as a sense of morality into law could be traced as far back as the Code of Hammurabi, which outlined “the laws which were enacted by a king of Babylonia in the third millennium B.C., whose rule extended over the whole of Mesopotamia”.<sup>127</sup> Some of the content of this code provides rights for “the oppressed and the victims of miscarriage of justice”,<sup>128</sup> outlining the first human rights recorded and likely, the first formal legal provision for treating others morally.

Both the humankind interpretation and the sense of morality interpretation of the term ‘humanity’ have shaped how the term ‘humanity’ is viewed in general and in law, as this section has illustrated that both interpretations have become woven into the legal framework. However, neither of these interpretations of ‘humanity’ are being adopted by

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<sup>122</sup> Robin Coupland, ‘Humanity: What is it and how does it influence international law?’ (2001) 83(844) *International Review of the Red Cross* 969, 978.

<sup>123</sup> Ruti Teitel, ‘For Humanity’ (2004) 3(2) *Journal of Human Rights* 225.

<sup>124</sup> Jonathan Glover, *Humanity: A Moral History of the Twentieth Century* (Pimlico 2001) 22.

<sup>125</sup> *Ibid.*

<sup>126</sup> *Ibid* 25: “[h]uman responses are the core of the humanity which contrasts with inhumanity. They are widely distributed, but to identify them with humanity is only partly an empirical claim. It remains also partly an aspiration.”

<sup>127</sup> C.H.W. Johns (translator), *The Oldest Code of Laws in the World: The Code of Law Promulgated by Hammurabi, King of Babylon B.C. 2285-2242* (T&T Clark 1903) v.

<sup>128</sup> Martha T Roth, ‘Mesopotamian Legal Traditions and the Laws of Hammurabi’ (1995) 71(1) *Chicago-Kent Law Review* 13, 17.

this research. While the “humanity-sentiment”<sup>129</sup> interpretation links to IHL in the sense of trying to restrict inhumane and immoral actions during armed conflict situations as much as possible, the definition of the principle of humanity has a strong foundation in IHL, which is drawn upon to establish how it is defined by this research in the following sub-section. A definition rooted in IHL is chosen for this research to ground the recommendations formed for the regulation of the use of weapons in Outer Space in IHL. The analysis of the other interpretations of humanity nevertheless inform this research. IHL and the limitations it places on actions in armed conflict situations is founded on moral and respectful treatment of others, as is seen in the reasoning of Henry Dunant in his actions that eventually resulted in the creation of the ICRC which Section 2.1 discusses. Furthermore, the considerations of humankind are also included in IHL, particularly the consequences that are felt by humankind as a result of the conduct of hostilities and weapons use. Such considerations are central to this research as the potential dangers faced by humankind from weapons use in Outer Space underpins the need to regulate the use of weapons in the Outer Space environment. Thus, while humanity in IHL is the primary focus of this research, the other interpretations of ‘humanity’ as a general term and these general interpretations seen incorporated into law inform this research.

### **2.2.3 The Principle of Humanity in International Humanitarian Law**

The role of principles in IHL are “of capital importance”,<sup>130</sup> as they underlie what is expressly enshrined in IHL treaty law. These are the principles of distinction,

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<sup>129</sup> Robin Coupland, ‘Humanity: What is it and how does it influence international law?’ (2001) 83(844) *International Review of the Red Cross* 969, 973.

<sup>130</sup> Jean Pictet, ‘The Principles of International Humanitarian Law (II)’ (1966) 67 *International Review of the Red Cross* 511, 512.

proportionality and military necessity, all of which stem from the central principle of humanity.<sup>131</sup> Together these principles serve “as the bone structure in a living body, providing guidelines in unforeseen cases and constituting a complete summary”<sup>132</sup> of the ideals underpinning IHL. Therefore, these principles may serve to fill lacunae in existing IHL codifications.<sup>133</sup>

However, while the other principles of distinction, military necessity, and proportionality all “carry a particular, and well-defined, meaning in IHL”,<sup>134</sup> the principle of humanity remains “vague in several respects”<sup>135</sup> and thus, can provide a broader protection without a strict definition which could exclude particular cases or instances. While Slim described the principle of humanity as “humanitarianism’s first principle”,<sup>136</sup> the broad nature of the principle of humanity may misrepresent its foundational role in IHL. However, the following sections illustrate that the principle of humanity still “holds primacy as a space of common ground”<sup>137</sup> between the principles of distinction, proportionality and military necessity, and thus, is central to IHL.

As it is not strictly defined, the scope of the principle of humanity is open to interpretation.

Tsagourias and Morrison note that the role of the foundational principle of humanity in

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<sup>131</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 47 – “the principle of humanity, which is also at the core of the laws of armed conflict”. See also Ryan J. Vogel, ‘Drone Warfare and the Law of Armed Conflict’ (2010) 39(1) *Denver Journal of International Law and Policy* 101, 127-128: “[t]he principle of humanity may be understood as the capstone of the other constraining principles, requiring parties to a conflict to exercise restraint when an act would cause superfluous injury or unnecessary suffering, even if it meets the requirements of necessity, distinction, and proportionality.”

<sup>132</sup> Jean Pictet, *Development and Principles of International Humanitarian Law* (Martinus Nijhoff Publishers 1985) 59-60.

<sup>133</sup> As noted in Jean Pictet, ‘The Principles of International Humanitarian Law (II)’ (1966) 67 *International Review of the Red Cross* 511, 512: “[t]hey [principles] contribute towards filling gaps in the law and help in their future development by indicating the path to be followed.”

<sup>134</sup> Kietil Muiezinovic Larsen, Camilla Guldahl Cooper and Gro Nystuen, *Searching for a ‘Principle of Humanity’ in International Humanitarian Law* (Cambridge University Press 2012) 1-2.

<sup>135</sup> *Ibid* 1.

<sup>136</sup> Hugo Slim, ‘Sharing a Universal Ethic: The Principle of Humanity in War’ (1998) 2(4) *The International Journal of Human Rights* 28.

<sup>137</sup> Larissa Fast, ‘Unpacking the principle of humanity: Tensions and implications’ (2015) 97 *International Review of the Red Cross* 111, 113.

IHL is “to ‘humanise’ the conduct of war by imposing limits on the means and methods of warfare, by according protection to certain categories of persons, by requiring humane treatment of captured persons and, in general, by limiting or mitigating unnecessary suffering.”<sup>138</sup> Similarly, Melzer asserts that “considerations of humanity impose certain limits on the means and methods of warfare and require that those who have fallen into enemy hands be treated humanely at all times”.<sup>139</sup> Crawford and Pert agree with this conception of the principle of humanity, recommending that it is “best understood as a limiting factor – the idea that there are, and should be, limits on what one does in times of armed conflict.”<sup>140</sup> The importance of the existence of such limits is that in the absence of express legislative regulation of an aspect of armed conflict, the requirement to abide by these limits means that the interests of humanity remain protected in armed conflict situations. These elements inform the broad definition of the principle of humanity being adopted for the purposes of this research, which focuses on limiting both the means and methods of warfare in armed conflict situations in order to reduce the unnecessary suffering and superfluous injury of combatants, civilians and those who are *hors de combat*. This is the definition being adopted as it includes the elements of the principle of humanity relevant to weapons regulation – limitation on the means and methods of warfare and the reduction of unnecessary suffering. As Best describes:

“if there are to be wars, and so long as wars go on, it is certainly better for the warring parties, and probably better for mankind at large, that the persons fighting should observe some prohibitions and restraints on how they do it; the idea, to put it at its briefest, of humanity in warfare.”<sup>141</sup>

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<sup>138</sup> Nicholas Tsagourias and Alasdair Morrison, *International Humanitarian Law: Cases, Materials and Commentary* (Cambridge University Press 2018) 39.

<sup>139</sup> Nils Melzer, *International Humanitarian Law: A Comprehensive Introduction* (ICRC 2019) 19.

<sup>140</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 50. Furthermore, the limiting nature on what can be done in armed conflict situations is outlined in Jean Pictet, ‘The Principles of International Humanitarian Law (II)’ (1966) 67 *International Review of the Red Cross* 511, 512, where the description of the roles of principles in IHL outlines that “the principles represent the rudiments of humanity, a minimum applicable at all times, in all places and circumstances which are valid even for States which may not be parties to the Conventions.”

<sup>141</sup> Geoffrey Best, *Humanity in Warfare: The Modern History of the International Law of Armed Conflicts* (Methuen & Co Ltd 1983) 2.

This research's definition focuses on the maintenance of humanity in times of armed conflict through the reduction of unnecessary suffering and through limiting the weapons that can be used during the conduct of hostilities.

As Section 2.1 outlines, IHL is one of the oldest branches of international law and its origins, rooted in the principle of humanity, have existed in "various cultures since ancient times".<sup>142</sup> With the definition of the principle of humanity being adopted for this research established, Section 2.3 discusses the significance of the Martens Clause as the legislative incarnation of the principle of humanity and its "modern origins in the 19<sup>th</sup> century".<sup>143</sup>

### **2.3 The Martens Clause**

Despite its significant history and centrality in IHL, the principle of humanity was not concretised in a legislative instrument until 1899, when the Martens Clause came into existence in the Hague Convention II.<sup>144</sup> It is important to emphasise that the Martens Clause "was not the origin of the principles of humanity but rather the specific acceptance by States in treaty form that these rules already existed outside of treaty law."<sup>145</sup> Thus, the previous section establishes, the principle of humanity and its position as a source of law in IHL pre-dated the Martens Clause. The Martens Clause is instead the incarnation of the principle of humanity in treaty-law and by virtue of the Martens Clause, the principle of humanity remains, as Meron notes, "an enduring legacy"<sup>146</sup> in IHL.

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<sup>142</sup> Kietil Muiezinovic Larsen, Camilla Guldahl Cooper and Gro Nystuen, *Searching for a 'Principle of Humanity' in International Humanitarian Law* (Cambridge University Press 2012) 3.

<sup>143</sup> Colin Smith and James Gallen, 'Cáin Adomnáin and the Laws of War' (2014) 16 *Journal of the History of International Law* 63.

<sup>144</sup> 1899 Hague Convention I.

<sup>145</sup> Michael Salter, 'Reinterpreting Competing Interpretations of the Scope and Potential of the Martens Clause' (2012) 17(3) *Journal of Conflict and Security Law* 403, 404.

<sup>146</sup> Theodor Meron, 'The Martens Clause, Principles of Humanity, and Dictates of Public Conscience' (2000) 94(1) *The American Journal of International Law* 78.

### 2.3.1 The Brussels Conference

Pustogarov notes that “[o]ne should begin the history of the appearance of the Martens Clause with the Brussels Conference of 1874.”<sup>147</sup> At the Brussels Conference, the drafter of the convention on laws and customs of land warfare was Russian lawyer, F.F. Martens. However, the Brussels Conference ended in failure because the “participants in their overwhelming majority refused to sign the proposed project.”<sup>148</sup> Ivanenko outlines that “[a]t that time, States, which had an unlimited right to war, could not yet accept the very idea of limiting warfare by any kind of international legal rules.”<sup>149</sup> It was this failure of the Brussels Conference that was at the forefront of Martens’ mind 25 years later when he entered the 1899 Hague Conference,<sup>150</sup> the process and outcome of which is discussed in the following sub-section.

### 2.3.2 The Hague Conference

While the Martens Clause serves as a humanitarian clause nowadays, Cassese notes that this was not Martens’ primary concern when he proposed the clause at the Hague Conference.<sup>151</sup> On the contrary, the Martens Clause was “an expedient way out of a diplomatic deadlock between the small powers, led by Belgium, and the major powers, consisting amongst others, of Russia and Germany”.<sup>152</sup> This deadlock occurred during

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<sup>147</sup> Vladimir V. Pustogarov, ‘The Martens Clause in International Law’ (1999) 1 *Journal of the History of International Law* 125.

<sup>148</sup> *Ibid.*

<sup>149</sup> Vitaliy Ivanenko, ‘The origins, causes and enduring significance of the Martens Clause: A view from Russia’ (2022) 104(920-921) *International Review of the Red Cross* 1708, 1718.

<sup>150</sup> Where he had the role of chairman, due to his drafting efforts at the 1874 Brussels Conference as outlined *Ibid* 1719: “Martens was elected chairman of the second commission, tasked with drawing up a convention on the laws and customs of war on land. To his great satisfaction, the commission based its deliberations on his draft convention on the laws and customs of war, which had been rejected by the Brussels Conference in 1874.”

<sup>151</sup> Antonio Cassese, ‘The Martens Cause: Half a Loaf or Simply Pie in the Sky?’ (2000) 11(1) *European Journal of International Law* 187, 193: “[i]n reality, the famous clause was not proposed by Martens with a humanitarian goal in mind.”

<sup>152</sup> *Ibid.* Also noted in Patrick Leisure, ‘The Martens Clause, Global Pandemics, and the Law of Armed Conflict’ (2021) 62(2) *Harvard Journal of International Law* 469, 475.

the negotiations wherein smaller States were concerned that leaving issues, such as the rights of citizens to resist occupation, unregulated in the instrument would cause uncertainty regarding the obligations of larger States.<sup>153</sup> These concerns sparked an intense debate which was “divided over whether those who forcibly resisted an invading army could be considered legitimate combatants or should be treated as criminals.”<sup>154</sup> The compromise to end this debate and save the negotiations for the Hague Convention from the same failure as the Brussels Conference was the Martens Clause.<sup>155</sup>

The original text of the Martens Clause, as included in the preamble of the 1899 Hague Convention, was as follows:

“[u]ntil a more complete code of the laws of war is issued, the High Contracting Parties think it right to declare that in cases not included in the Regulations adopted by them, populations and belligerents remain under the protection and empire of the principles of international law, as they result from usages established between civilized nations, from the laws of humanity, and the requirements of public conscience.”<sup>156</sup>

This clause “left open the possibility of arguing that there existed principles or customary rules of international law”<sup>157</sup> (i.e., the principle of humanity and dictates of public

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<sup>153</sup> Ibid, 195. Vitaliy Ivanenko, ‘The origins, causes and enduring significance of the Martens Clause: A view from Russia’ (2022) 104(920-921) *International Review of the Red Cross* 1708, 1719, outlines the arguments made by the smaller State against the larger, European powers: “before the final vote, the Belgian delegate, Édouard Descamps, suddenly spoke up and, on behalf of Europe’s smaller States, insisted that amendments be made to the agreed text giving the population of (fully or partially) occupied States the right to armed resistance against occupying forces. In the course of the ceaseless wars, smaller nations had constantly been the victims. However, the delegations of the major European powers, which were constantly at war with each other, strongly opposed such a modification, arguing that recognition of the right of the population to resist would legalize acts of perfidy, treachery and brutality against the members of invading or occupying enemy forces.”

<sup>154</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 50.

<sup>155</sup> As noted in Jeffrey Khan, ‘Protection and Empire: The Martens Clause, State Sovereignty, and Individual Rights’ (2016) 56 *Virginia Journal of International Law* 1, 24: “[t]he Martens Clause that emerged was the successful compromise that saved the conference.” See also Emily Crawford, ‘The Modern Relevance of the Martens Clause’ (2006) 6 *ISIL Yearbook of International Humanitarian and Refugee Law* 1: “[t]he impasse was not overcome until the Russian delegate, Fyodor Fyodorich von Martens, suggested a compromise position which decreed that, until a more complete set of laws of armed conflict could be decided upon, the community of nations was not to assume that the law was silent on matters that were not codified in treaty form.”

<sup>156</sup> 1899 Hague Convention II, preamble.

<sup>157</sup> Antonio Cassese, ‘The Martens Clause: Half a Loaf or Simply Pie in the Sky?’ (2000) 11(1) *European Journal of International Law* 187, 198.

conscience) which would provide guidance in the areas causing dispute amongst State parties to the Hague Convention. This meant that there was a minimum standard of protection and obligation provided in cases that were not expressly regulated in IHL instruments. The Clause provided a compromise between States on their debates but would also have an impact on and be included in the IHL instruments that would follow. The laws of humanity, representative of the principle of humanity in IHL, are separate from the requirements of public conscience also referenced within the Martens Clause. Lewis highlights how the ICJ Advisory Opinion on the *Legality of the Threat or Use of Nuclear Weapons*<sup>158</sup> contained “reasoning focussed primarily on the application of the ‘established principles of humanity,’ including that of distinction and the prohibition of unnecessary suffering, rather than the separate content of ‘public conscience.’”<sup>159</sup> However, no clarity came from this judgment with respect to a definition for ‘dictates of public conscience’.<sup>160</sup>

### 2.3.3 The Impact of the Martens Clause

As illustrated through the drafting process of the Hague Convention II, the “humanitarian rhetoric”<sup>161</sup> of the clause that would become Martens’ namesake was created “for the purpose merely of solving a diplomatic problem.”<sup>162</sup> As Stapleton-Coory notes, the

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<sup>158</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996.

<sup>159</sup> Angeline Lewis, ‘Conflating Conscience and Legality in International Law: Implications for the Future’ (2019) 40(2) *Adelaide Law Review* 447, 450.

<sup>160</sup> See *Ibid* 451 where it is noted that “[t]he lack of definition of the ‘public conscience’ by the majority in the Nuclear Weapons Advisory Opinion has led to continued judicial debate as to its place in law.”

<sup>161</sup> Rotem Giladi, ‘The Enactment of Irony: Reflections on the Origins of the Martens Clause’ (2014) 25(3) *The European Journal of International Law* 847, 853.

<sup>162</sup> Antonio Cassese, ‘The Martens Cause: Half a Loaf or Simply Pie in the Sky?’ (2000) 11(1) *European Journal of International Law* 187, 201-202. See also Mitchell Stapleton-Coory, ‘The Enduring Legacy of the Martens Clause: Resolving the Conflict of Morality in International Humanitarian Law’ (2019) 40(2) *Adelaide Law Review* 471, 472: “[h]aving emerged in history as little more than a cunning ‘diplomatic ploy’”.

“combination of circumstances that produced the Martens Clause is often relied upon to subvert its legal rigour.”<sup>163</sup>

However, while the Martens Clause “was not achieved out of humanitarian motivations,”<sup>164</sup> it was the concretisation of the principle of humanity that was praised and heralded as being “extremely modern and indeed forward-looking”<sup>165</sup>. Salter notes that interpreting the Martens Clause in line with “the original historical context or ‘original intent’ is absurd in relation to a measure that, for over a century, has been repeatedly re-affirmed within numerous different international treaties and convention”.<sup>166</sup> Those instruments, which are outlined in the following section, have enshrined the Martens Clause in a humanitarian context. Thus, while Martens saw “no application for his work in the nineteenth-century internal affairs of states”,<sup>167</sup> it is evident that “Martens’ worldview is no longer our own.”<sup>168</sup> As the needs of international law have expanded, “the reach and importance of the Martens Clause has grown”<sup>169</sup> accordingly.

Cassese notes that “what ultimately matters is the overall effect that a legal construct may produce, regardless of the intentions of its author”<sup>170</sup> and the Martens Clause ultimately resulted in the principle of humanity being enshrined in the treaty-law of IHL. As Kolb highlighted, the principles of IHL should “be rooted in some written legal regime on

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<sup>163</sup> Mitchell Stapleton-Coory, 'The Enduring Legacy of the Martens Clause: Resolving the Conflict of Morality in International Humanitarian Law' (2019) 40(2) *Adelaide Law Review* 471, 475.

<sup>164</sup> Antonio Cassese, 'The Martens Cause: Half a Loaf or Simply Pie in the Sky?' (2000) 11(1) *European Journal of International Law* 187, 216.

<sup>165</sup> *Ibid* 201.

<sup>166</sup> Michael Salter, 'Reinterpreting Competing Interpretations of the Scope and Potential of the Martens Clause' (2012) 17(3) *Journal of Conflict and Security Law* 403, 412.

<sup>167</sup> Jeffrey Khan, 'Protection and Empire: The Martens Clause, State Sovereignty, and Individual Rights' (2016) 56 *Virginia Journal of International Law* 1.

<sup>168</sup> *Ibid*.

<sup>169</sup> *Ibid*.

<sup>170</sup> Antonio Cassese, 'The Martens Cause: Half a Loaf or Simply Pie in the Sky?' (2000) 11(1) *European Journal of International Law* 187, 216. See also Mitchell Stapleton-Coory, 'The Enduring Legacy of the Martens Clause: Resolving the Conflict of Morality in International Humanitarian Law' (2019) 40(2) *Adelaide Law Review* 471, 484: “[t]hus, it is not what was meant by the Clause that counts, but rather what it has meant to us in previous years.”

which they can take a firm hold.”<sup>171</sup> The Martens Clause constituted the codification of the principle of humanity as an “originally moral principle, inspired by mercy, compassion and solidarity.... into the positive law of armed conflicts”.<sup>172</sup>

While the concretization of the principle of humanity in the Martens Clause provides this important grounding, it is nevertheless left vague “to be dynamic”<sup>173</sup> enough to continually have effect and significance in the ever-evolving circumstances of IHL.<sup>174</sup> While, as previously noted, this vague and undefined nature is what differentiates the principle of humanity from the other principles of IHL, it allows the principle of humanity to be included in numerous legislative instruments through the Martens Clause, as is discussed in the next section. The inclusion of the principle of humanity in the IHL instruments that are discussed in the following section serves to re-iterate the centrality of the principle to IHL. Inclusion through the Martens Clause also solidifies the role of the principle as providing protection in instances not expressly dealt with in IHL, such as the gap in the legal regime that regulates the use of weapons in Outer Space. Weapons use specific to the Outer Space environment is currently provided for by the Martens Clause, and the minimum protection of the principle of humanity therein. This will be expanded upon in this research through using the principle of humanity as the lens through which to form recommendations for express regulation of weapons use in Outer Space.

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<sup>171</sup> Robert Kolb, *Advanced Introduction to International Humanitarian Law* (Edward Elgar Publishing Limited 2014) 51.

<sup>172</sup> *Ibid* 79.

<sup>173</sup> *Ibid* 75.

<sup>174</sup> See Patrick Leisure, ‘The Martens Clause, Global Pandemics, and the Law of Armed Conflict’ (2021) 62(2) *Harvard Journal of International Law* 469, 476: “the Clause and its protections have proved obstinate in the years since its inclusion in the preamble.”

## 2.4 Instruments Containing the Martens Clause and the Principle of Humanity

As demonstrated in the previous section, the introduction of the Martens Clause constituted a significant development for the principle of humanity as it became grounded in treaty law. The 1899 Hague Convention became the first in a long line of IHL instruments which include the Martens Clause. As Smith notes, “[t]here are multiple versions of the Martens Clause to be found throughout the laws of armed conflict, each containing ever so slight modifications on previous versions”.<sup>175</sup> The principle of humanity “reaches all parts of international humanitarian law”<sup>176</sup> and the inclusion of the Martens Clause in many of the instruments outlined in this section means that the principle of humanity can apply to any omissions in IHL instruments, as it is inevitable that “all codifications omit some matters”.<sup>177</sup> Therefore, the inclusion of the Martens Clause in the following instruments consolidates the importance of the principle of humanity to the effective functioning of IHL. The role of the principle of humanity as provided for in the Martens Clause is important to the issue of weapons use in Outer Space dealt with in this research as there is a gap in the ISL and IHL frameworks with regards to weapons use specifically in the Outer Space environment. With only the placement of nuclear weapons and weapons of mass destruction in Outer Space, as well as the testing of weapons on the Moon and other celestial bodies, prohibited,<sup>178</sup> there is a significant gap with regards to the use of other weapons in this environment. This gap is currently addressed by the guidance of the principle of humanity as provided for in the

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<sup>175</sup> Tara Smith, ‘Challenges in identifying binding Martens Clause rules from the ‘dictates of public conscience’ to protect the environment in non-international armed conflict’ (2019) 10(2) *Transnational Legal Theory* 184, 188.

<sup>176</sup> Theodor Meron, ‘The Martens Clause, Principles of Humanity, and Dictates of Public Conscience’ (n 40) 79.

<sup>177</sup> *Ibid* 80.

<sup>178</sup> 1967 Outer Space Treaty, art IV.

Martens Clause. The IHL instruments in which this clause is enshrined are addressed in the following sections.

#### **2.4.1 1907 Hague Convention<sup>179</sup>**

The next instrument following the 1899 Hague Convention which included the Martens Clause was the Hague Convention 1907,<sup>180</sup> although expressed in “a somewhat modified form”.<sup>181</sup> In 1899, Martens and his fellow delegates were still of the belief that “state sovereignty was privileged above all other values as the cornerstone of international law.”<sup>182</sup> This belief in the sovereignty of States meant that there “no room for the claim that states were obligated to protect certain individual rights”.<sup>183</sup> However, the Martens Clause resulted in the protection of the individual rights of combatants in the 1899 Hague Convention. Therefore, this move away from a purely state sovereignty focus was elaborated on in the modification of the wording of the Marten Clause in the 1907 Hague Convention. For example, in the 1907 Hague Convention, “empire”<sup>184</sup> was changed to “the rule”<sup>185</sup> of the law of nations, moving away from the vocabulary of state sovereignty. The phrasing of “usages established by civilised nations”<sup>186</sup> was altered to “usages established among civilized people”,<sup>187</sup> which, as noted by Smith, “is not insignificant, as it is less clear that ‘usages established among civilized people’ refers to customary and

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<sup>179</sup> Hague Convention (IV) Respecting the Laws and Customs of War on Land and Its Annex: Regulations Concerning the Laws and Customs of War on Land (signed 18 October 1907, entered into force 26 January 1910) (1907 Hague Convention).

<sup>180</sup> Ibid.

<sup>181</sup> Emily Crawford, ‘The Modern Relevance of the Martens Clause’ (2006) 6 ISIL Yearbook of International Humanitarian and Refugee Law 1, 3.

<sup>182</sup> Jeffrey Khan, ‘Protection and Empire: The Martens Clause, State Sovereignty, and Individual Rights’ (2016) 56 Virginia Journal of International Law 1, 46.

<sup>183</sup> Ibid 31.

<sup>184</sup> 1899 Hague Convention II, preamble.

<sup>185</sup> 1907 Hague Convention, preamble.

<sup>186</sup> 1899 Hague Convention II, preamble.

<sup>187</sup> 1907 Hague Convention, preamble.

treaty-based laws developed by states in the traditional way under international law.”<sup>188</sup> This again illustrates a move away from a state-sovereignty focus. This was also the instrument in which the phrase “the dictates of public conscience”<sup>189</sup> was coined. While these small changes did not change the overall function of the Martens Clause, they updated the clause to represent the landscape of IHL at the time. The updating of the phrasing of the Martens Clause in its inclusion in the 1907 Hague Convention shows the making of changes to ensure the clause remains relevant, including the role of the principle of humanity therein. The clause continues to remain relevant today as it applies to the gap in the ISL and IHL frameworks in relation to the possibility of armed conflict and weapons use in Outer Space.

#### **2.4.2 1949 Geneva Conventions<sup>190</sup>**

The Martens Clause was incorporated into the 1949 Geneva Conventions but not in the preamble, where it was included in the 1899 and 1907 Hague Conventions. The preambles of the 1949 Geneva Conventions are very brief and do not “include the usual statement of the motives”<sup>191</sup> of the contracting States and it is noted that “[i]t is not always a matter of indifference whether a treaty does or does not open with a statement of motives and an

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<sup>188</sup> Tara Smith, ‘Challenges in identifying binding Martens Clause rules from the ‘dictates of public conscience’ to protect the environment in non-international armed conflict’ (2019) 10(2) *Transnational Legal Theory* 184, 189.

<sup>189</sup> 1907 Hague Convention, preamble.

<sup>190</sup> Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field (signed 12 August 1949, entered into force 21 October 1950) 75 UNTS 31 (1949 Geneva Convention I); Geneva Convention for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea (signed 12 August 1949, entered into force 21 October 1950) 75 UNTS 85 (1949 Geneva Convention II); Geneva Convention Relative to the Treatment of Prisoners of War (signed 12 August 1949, entered into force 21 October 1950) 75 UNTS 135 (1949 Geneva Convention III); Geneva Convention Relative to the Protection of Civilian Persons in Time of War (signed 12 August 1949, entered into force 21 October 1950) 75 UNTS 287 (1949 Geneva Convention IV).

<sup>191</sup> Jean S. Pictet et al (ed), *The Geneva Conventions of 12 August 1949. I: Geneva Convention I for the amelioration of the condition of the wounded and sick in armed forces in the field: commentary* (ICRC 1952) 18.

exact definition of its object.”<sup>192</sup> Rather, the Martens Clause was “included in the operative paragraphs of each treaty which dealt with denunciation”,<sup>193</sup> in a way in which States cannot denounce the obligations created by the Clause. This is illustrative of the continued significance of the Martens Clause, as it is enshrined in a way in which States cannot avoid its obligations. In the Geneva Conventions, outside of the obligations expressed therein, States remain bound by “the principles of the law of nations, as they result from the usages established among civilized peoples, from the laws of humanity and the dictates of the public conscience.”<sup>194</sup>

### **2.4.3 1977 Additional Protocols**<sup>195</sup>

When included in the Additional Protocols of 1977, the Martens Clause became subject to some “modernization”<sup>196</sup> once again. The Clause is not in the preamble but the main body of Additional Protocol I, which Ivanenko notes “undoubtedly strengthens its legal status”.<sup>197</sup> In Article 1(2) of Additional Protocol I, it is stated that “[i]n cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public

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<sup>192</sup> Ibid 20.

<sup>193</sup> Tara Smith, ‘Challenges in identifying binding Martens Clause rules from the ‘dictates of public conscience’ to protect the environment in non-international armed conflict’ (2019) 10(2) *Transnational Legal Theory* 184, 189-190.

<sup>194</sup> 1949 Geneva Convention I, art 63; 1949 Geneva Convention II, art 62; 1949 Geneva Convention III, art 142; 1949 Geneva Convention IV, art 158.

<sup>195</sup> 1977 Additional Protocol I; Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of Non-International Armed Conflicts (adopted 8 June 1977, entered into force 7 December 1978) 1125 UNTS 609 (1977 Additional Protocol II).

<sup>196</sup> Emily Crawford, ‘The Modern Relevance of the Martens Clause’ (2006) 6 *ISIL Yearbook of International Humanitarian and Refugee Law* 1, 4.

<sup>197</sup> Vitaliy Ivanenko, ‘The origins, causes and enduring significance of the Martens Clause: A view from Russia’ (2022) 104(920-921) *International Review of the Red Cross* 1708, 1721.

conscience.”<sup>198</sup> Thus, the “usages established among civilized peoples”<sup>199</sup> was replaced with “established custom”<sup>200</sup> and the “laws of humanity”<sup>201</sup> became “the principles of humanity”.<sup>202</sup> Ivanenko credits the changing of the phrasing to addressing that which was “clearly outdated”.<sup>203</sup>

With regards to the Martens Clause as enshrined in the preamble of Additional Protocol II, which applies to non-international armed conflicts, the wording was altered in the preamble and instead “[a] more abbreviated form”<sup>204</sup> was adopted for express application to non-international armed conflicts. This shorter clause outlines that “[i]n cases not covered by the law in force, the human person remains under the protection of the principles of humanity and the dictates of the public conscience.”<sup>205</sup> The reasoning behind the change is addressed in the 1987 Commentary on Additional Protocol II, which explains that “[t]he wording of the paragraph under consideration here is shorter and takes into account the specific nature of non-international armed conflicts.”<sup>206</sup> To-date certain States’ capability to use weapons in Outer Space has been witnessed which suggests that an armed conflict that could occur in Outer Space would be an IAC. Nevertheless, as more private Space actors carry out activities in Outer Space, a NIAC occurring in Outer

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<sup>198</sup> 1977 Additional Protocol I, art 1(2).

<sup>199</sup> 1907 Hague Convention, preamble. See also 1949 Geneva Convention I, art 63; 1949 Geneva Convention II, art 62; 1949 Geneva Convention III, art 142; 1949 Geneva Convention IV, art 158.

<sup>200</sup> 1977 Additional Protocol I, art 1(2).

<sup>201</sup> 1899 Hague Convention II.

<sup>202</sup> 1977 Additional Protocol I, art 1(2).

<sup>203</sup> Vitaliy Ivanenko, ‘The origins, causes and enduring significance of the Martens Clause: A view from Russia’ (2022) 104(920-921) *International Review of the Red Cross* 1708, 1721: “the original expression “civilized nations” has been dropped, as it is clearly outdated. For the same reason, modern legal terms are used: “authority” instead of “empire”, “combatants” instead of “belligerents”, “principles of humanity” instead of “laws of humanity”, and the more precise term “civilians” rather than “population”.”

<sup>204</sup> Jeffrey Kahn, ‘Protection and Empire: The Martens Clause, State Sovereignty, and Individual Rights’ (2016) 56(1) *Virginia Journal of International Law* 1, 26.

<sup>205</sup> 1977 Additional Protocol II, preamble.

<sup>206</sup> ICRC International Humanitarian Law Database, ‘Treaties, States Parties and Commentaries: Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of Non-International Armed Conflicts (Protocol II), 8 June 1977., Commentary of 01.01.1987, Preamble’ < <https://ihl-databases.icrc.org/en/ihl-treaties/apii-1977/preamble/commentary/1987?activeTab=undefined> > accessed 21 March 2023, para 4433.

Space is possible. Thus, the application of the Martens Clause and in it, the principle of humanity, to NIACs is important with respect to the gap in the ISL and IHL regimes dealing with weapons regulation in Outer Space.

The modifications that have been made to the Martens Clause throughout its inclusion in the above-mentioned instruments, while they do not alter the function of the Martens Clause, nevertheless serve to keep the clause updated and representative of the landscape of IHL at the respective times. These modifications facilitate the continued relevance of the clause and its inclusion in future IHL instruments, with such inclusion in other forms of IHL instruments discussed in the following sub-sections.

#### **2.4.4 The Martens Clause in Weapons Regulation Instruments**

As illustrated, the Martens Clause has been incorporated into many IHL instruments, and this also includes instruments dealing specifically with weapons regulation. This demonstrates the role the principle of humanity has to play in the area of weapons regulation in IHL. Fast highlights that “law related to arms control and disarmament promotes humanity by...constraining the use of armed force”<sup>207</sup> with regards to the regulation and/or prohibition of certain weapons, aligning with the placement of limits on the means and methods of warfare in the principle of humanity. Thus, the principle of humanity has also been incorporated through the inclusion of the Martens Clause in various weapons regulation treaties in order to reduce unnecessary suffering caused by the use of these weapons. For example, the Martens Clause appears in the Preamble to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional

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<sup>207</sup> Larissa Fast, ‘Unpacking the principle of humanity: Tensions and implications’ (2015) 97 *International Review of the Red Cross* 111, 117.

Weapons (CCW),<sup>208</sup> wherein paragraph five establishes that “the civilian population and the combatants shall at all times remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience.”<sup>209</sup> Again, it is highlighted by Pustogarov that “neither the clause’s content nor its structure have changed”<sup>210</sup> which exemplifies the universality of the Martens Clause.

This research asserts that the Martens Clause has become a cornerstone of weapons regulation instruments in IHL. Re-iteration of elements of the Martens Clause, emphasising “the role of public conscience in furthering the principles of humanity as evidenced by the call for a total ban of anti-personnel mines”,<sup>211</sup> was seen in the preamble to the 1997 Anti-Personnel Mine Ban Convention. The Martens Clause as it appeared in the CCW is also included in the preamble of the 2008 Convention on Cluster Munitions.<sup>212</sup>

Weapons regulation within the IHL framework is dealt with in greater detail in Chapter 4. Nevertheless, the inclusion of the Martens Clause as discussed in this section highlights that the principle of humanity and its role of reducing unnecessary suffering are central to weapons regulation in IHL. The importance of the Martens Clause, and its role in IHL instruments discussed in this section and in Chapter 4, is seen to apply to Outer Space with regards to the gap in the regulation of weapons use in Outer Space. The Martens Clause currently ensures that this gap is addressed by the minimum protection of the

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<sup>208</sup> 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 (adopted 10 October 1980, entered into force 2 December 1983) 1342 UNTS 137 (1980 Convention on Certain Conventional Weapons).

<sup>209</sup> Ibid preamble, para 5.

<sup>210</sup> Vladimir V. Pustogarov, ‘The Martens Clause in International Law’ (1999) 1 *Journal of the History of International Law* 125, 129.

<sup>211</sup> Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction (adopted 18 September 1997, entered into force 1 March 1999) 2056 UNTS 211 (1997 Anti-Personnel Mine Ban Convention), preamble, para. 8.

<sup>212</sup> Convention on Cluster Munitions (adopted 30 May 2008, entered into force 1 August 2010) 2688 UNTS 39 (2008 Convention on Cluster Munitions) preamble, para. 11.

principle of humanity. The principle of humanity is at the centre of IHL, as seen from it being expressly enshrined in IHL instruments through the Martens Clause. This centrality is the reason for which the recommendations for weapons regulation in this research are formed through the lens of this principle.

#### **2.4.5 Military Manuals**

In addition to the incorporation of the principle of humanity into these IHL instruments by virtue of the Martens Clause, the same clause has also been adopted in “several national military manuals, including those of the United States, the United Kingdom, and Germany”.<sup>213</sup> Khan notes that “[w]ith the introduction by treaty of the law of armed conflict into conflicts ‘not of an international character’ beginning in 1949, the Martens Clause gained entrée to domestic applications.”<sup>214</sup> The inclusion of the Martens Clause into domestic military manuals is significant as it solidifies the position of the principle of humanity as central to modern IHL as much as it was in historic times. While military attention normally falls to the principles of distinction, military necessity, and proportionality because of the affects that these principles have on military manoeuvres, targeting decisions, etc.; this recognition of the principle of humanity bolsters its overall importance.

#### **2.4.6 Customary IHL**

The ICRC’s Customary IHL Database (which resulted from a study commissioned by the ICRC) is a collective summary of the rules that have gained the status of customary law

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<sup>213</sup> Theodor Meron, ‘The Martens Clause, Principles of Humanity, and Dictates of Public Conscience’ (2000) 94(1) *The American Journal of International Law* 78.

<sup>214</sup> Jeffrey Kahn, ‘Protection and Empire: The Martens Clause, State Sovereignty, and Individual Rights’ (2016) 56(1) *Virginia Journal of International Law* 1, 37.

in IHL. While customary IHL is dealt with in greater detail in Chapter 3, the position of the Martens Clause, and the principle of humanity therein, with regards to customary IHL is briefly discussed.

The aforementioned database notes that the Hague Conventions of 1899 and 1907 “did not codify all aspects of custom, but its continued importance was reaffirmed in the so-called “Martens clause””.<sup>215</sup> Thus, aspects of customary IHL are noted to have been codified by the Martens Clause. It is also recognised that the clause, and the principle of humanity, is accepted by the ICRC as being “generally applicable”<sup>216</sup> to States and thus, constitutes custom itself. The customary status of the Martens Clause is important as it applies to all States and this is currently the case with regards to the gap in the IHL and ISL frameworks with regards to the use of weapons in Outer Space. The lack of regulation of the use of weapons, apart from nuclear weapons or weapons of mass destruction, means that weapons use in Outer Space is currently addressed by the Martens Clause and its customary nature facilitates this application to all States.

#### **2.4.7 Other Manifestations of the Principle of Humanity in IHL**

As has been established in this chapter, the Martens Clause plays a significant role in expressly incorporating the principle of humanity into IHL instruments and enshrining the principle as a minimum protection in instances not provided for in IHL instruments.

Nevertheless, the principle of humanity is also enshrined in IHL instruments independent of the Martens Clause. While not included in the definition of the principle of humanity

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<sup>215</sup> ICRC International Humanitarian Law Database, ‘Customary IHL: Introduction’ < <https://ihl-databases.icrc.org/en/customary-ihl/v1/in>> accessed 21 March 2023.

<sup>216</sup> ICRC, ‘How Does Law Protect in War? Martens Clause’ < [https://casebook.icrc.org/a\\_to\\_z/glossary/martens-clause#:~:text=The%20Martens%20Clause%2C%20understood%20today,part%2C%20by%20other%20IHL%20instruments](https://casebook.icrc.org/a_to_z/glossary/martens-clause#:~:text=The%20Martens%20Clause%2C%20understood%20today,part%2C%20by%20other%20IHL%20instruments)> accessed 21 March 2023.

adopted by this research as it is not especially relevant for the purpose of analysing weapons regulation and for forming recommendations for such regulation; the protection of those injured, prisoners of war and civilians is enshrined in the four 1949 Geneva Conventions.<sup>217</sup> For example, in Geneva Convention IV, Article 27 highlights that the civilian population “shall at all times be humanely treated”<sup>218</sup> and this standard of humane treatment is applied by the Geneva Conventions to non-international armed conflicts in Common Article 3.<sup>219</sup> These protections for those not actively participating in an armed conflict situation stem from the integration of the principle of humanity into these IHL instruments focusing in particular on the element of the principle that ensures protection and humane treatment of these individuals. Again, while not necessarily relevant to the weapons regulation focus of this research, it does illustrate the manifestations of the principle of humanity in IHL instruments independent of the Martens Clause.

Furthermore, in relation to the elements of the principle of humanity most relevant to weapons regulation and thus, included in the definition adopted in this research, [t]he prohibition on the use of weapons that cause unnecessary suffering and superfluous injury is described by Chetail as “a reaffirmation of a long established provision of international customary law, codified in the preamble of the 1868 Saint Petersburg Declaration, the Hague Regulations of 1899 and 1907 and restated in Additional Protocol I.”<sup>220</sup> The customary nature of the rule is seen in its inclusion as Rule 70 in the ICRC Customary IHL Database.<sup>221</sup> Thus, the element of the principle of humanity which places limitations

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<sup>217</sup> 1949 Geneva Conventions I, II, III and IV.

<sup>218</sup> 1949 Geneva Convention IV, art 27.

<sup>219</sup> 1949 Geneva Conventions I – IV, art 3(1): “[p]ersons taking no active part in the hostilities, including members of armed forces who have laid down their arms and those placed hors de combat by sickness, wounds, detention, or any other cause, shall in all circumstances be treated humanely”.

<sup>220</sup> Vincent Chetail, ‘The Fundamental Principles of Humanitarian Law Through the Case Law of the International Court of Justice’ (2002) 21(3) *Refugee Survey Quarterly* 199, 202.

<sup>221</sup> ICRC International Humanitarian Law Database, ‘Rule 70: Weapons of a Nature to Cause Superfluous Injury and Unnecessary Suffering’ < <https://ihl-databases.icrc.org/en/customary-ihl/v1/rule70> > accessed 21 August 2023.

on weapons that cause unnecessary suffering or superfluous injury is a rule of customary IHL, as well as being enshrined in the above-discussed IHL instruments, as well as weapons regulation instruments discussed in Chapter 4.

The Martens Clause is important in enshrining the principle of humanity in IHL treaty-law as providing a minimum standard of protection in cases which are not provided for in IHL instruments. This is currently the case with the gap that exists in the ISL and IHL frameworks and the lack of specific regulation for the use of weapons in Outer Space. The role of the principle of humanity in providing the minimum standard of protection makes it the logical basis from which to form recommendations for regulation, which this research does. Nevertheless, this sub-section illustrates that the Martens Clause and the principle of humanity are not one and the same and the central elements of the principle of humanity are also enshrined in IHL instruments outside of the Martens Clause.

The inclusion of the Martens Clause and within it, the principle of humanity, in IHL instruments, domestic military manuals and custom, is illustrative of the nature of the principle of humanity as foundational to IHL as a whole. The role of the Martens Clause in concretising the principle of humanity in IHL treaty-law cannot be understated. The broad and unspecific nature of the principle of humanity allows for its protection to apply in as many cases as possible. However, the broad nature of the principle and the wording of the Martens Clause can lead to different interpretations as to the role of the Clause. While the clause currently provides that the minimum standard of protection of the principle of humanity applies to the gap in the legal framework with regards to weapons use in Outer Space, recommendations for specific regulation are formed in this research because the Martens Clause cannot of itself limit or prohibit weapons use, as is alluded to in some of the interpretations discussed in the following section.

## 2.5 Interpretation of the Martens Clause

The inclusion of the Martens Clause, and in it the principle of humanity, into the previously-discussed IHL instruments illustrates that the centrality of the principle in IHL has not faded over time but has rather flourished through the Martens Clause which “extends its principles much further than its drafter could have imagined.”<sup>222</sup> Thus, the principle of humanity, through its inclusion in these instruments, still has a significant place in IHL, in spite of its vague and undefined nature. It is this vague nature of the principle which facilitates its universal applicability and makes the Martens Clause a “provision for centuries to come.”<sup>223</sup> However, this lack of a specific definition is not without its difficulties. While Meron notes with regards to the Martens Clause that “[t]he rhetorical and ethical language of the clause has compensated for its somewhat vague and indeterminate legal content”<sup>224</sup> in that it facilitates the application of the principle of humanity to a wider variety of situations; the interpretation of this language has constituted “the subject of debate amongst judges, scholars, states and NGOs.”<sup>225</sup> This has resulted in varying interpretations of the Martens Clause, and the principle of humanity with it; both “narrow and expansive”<sup>226</sup> interpretations. Ticehurst notes that “[t]he problem faced by humanitarian lawyers is that there is no accepted interpretation of the Martens Clause.”<sup>227</sup> This section investigates the variety of interpretations of the Martens Clause and the principle of humanity and how this affects the continued

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<sup>222</sup> Jeffrey Kahn, ‘Protection and Empire: The Martens Clause, State Sovereignty, and Individual Rights’ (2016) 56(1) *Virginia Journal of International Law* 1, 43-44.

<sup>223</sup> Vladimir V. Pustogarov, ‘The Martens Clause in International Law’ (1999) 1 *Journal of the History of International Law* 125, 129.

<sup>224</sup> Theodor Meron, ‘The Humanization of Humanitarian Law’ (2000) 94(2) *The American Journal of International Law* 239, 245.

<sup>225</sup> Tyler D. Evans, ‘At War with the Robots: Autonomous Weapon Systems and the Martens Clause’ (2013) 41 *Hofstra Law Review* 697, 716.

<sup>226</sup> Emily Crawford, ‘The Modern Relevance of the Martens Clause’ (2006) 6 *ISIL Yearbook of International Humanitarian and Refugee Law* 1, 7.

<sup>227</sup> Rupert Ticehurst, ‘The Martens Clause and the Laws of Armed Conflict’ (1997) 317 *International Review of the Red Cross* < <https://www.icrc.org/en/doc/resources/documents/article/other/57jnhy.htm> > accessed 26 September 2023.

relevance of these central components to IHL. The different interpretations of the Martens Clause, and the principle of humanity therein, illustrate the different understandings of the role of the Clause and principle in the IHL framework. The principle of humanity is recognised by this research as central to IHL and it is for this reason that it constitutes the lens through which the recommendations for the regulation of the use of weapons in Outer Space are formed. However, some interpretations of the Martens Clause can be restrictive of the protection that the principle of humanity grants through the Clause. This section discusses the varying interpretations.

### **2.5.1 The Martens Clause as a Reminder of the Principle of Humanity**

Salter investigates a variety of interpretations of the Martens Clause, “[w]ithout suggesting that there are clear-cut or mutually exclusive distinctions”<sup>228</sup> with respect to this matter. Restrictive interpretations of the Martens Clause limit the functions of the principle of humanity to that of “an a contrario device, reminding states that even where there is no formal and express obligation...there can still be international law duties”.<sup>229</sup> Thus, under this interpretation, the Martens Clause simply serves to remind States of the principle of humanity. Evans highlights that this interpretation is widely accepted by the United States, as one of the most influential States with regards to armed conflict. They have “subscribed to the view that the Martens Clause merely clarifies the existence and applicability of customary international law not explicitly addressed by the agreements contained in multinational conventions.”<sup>230</sup> This interpretation relegates the status of the principle of humanity enshrined in the Martens Clause to merely belonging to a greater

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<sup>228</sup> Michael Salter, ‘Reinterpreting Competing Interpretations of the Scope and Potential of the Martens Clause’ (2012) 17(3) *Journal of Conflict and Security Law* 403, 407.

<sup>229</sup> *Ibid* 409.

<sup>230</sup> Tyler D. Evans, ‘At War with the Robots: Autonomous Weapon Systems and the Martens Clause’ (2013) 41 *Hofstra Law Review* 697, 716-717.

body of customary international law. The role of the Martens Clause in highlighting the significance and importance of the principle of humanity in IHL is therefore restricted by this interpretation. When this interpretation is advocated for by a State with as much military power as the United States, it is possible that it may diminish the role of the Martens Clause. However, with the Martens Clause currently addressing the gap in the legal frameworks for the regulation of the use of weapons in Outer Space, this research maintains that this evidences that its role remains relevant today.

### **2.5.2 The Martens Clause as an Interpretative Aide**

Another understanding is that the Martens Clause is merely an interpretative aide. This means that “[i]n the event of such problems of ambiguous precedents and conflicting or insufficiently comprehensive authorities, the Clause authorizes judges to select that interpretation of fact and law which best gives the effect to the standards endorsed by this measure.”<sup>231</sup> The Martens Clause, when utilised as an interpretive aid, acts as “a motor driving the incremental judicial expansion of the scope of international humanitarian law”.<sup>232</sup> This interpretation of the Martens Clause was seen in the *Kupreškić*<sup>233</sup> case before the International Criminal Tribunal for the former-Yugoslavia (hereinafter referred to as the ICTY). In this case, Kupreškić was being tried for breaches of the laws and customs of war committed during attacks on Muslim areas in Bosnia-Herzegovina. It was noted in the decision of the ICTY that the Martens Clause “enjoins, as a minimum, reference to those principles and dictates any time a rule of international humanitarian law is not sufficiently rigorous or precise”.<sup>234</sup> However, there are limitations to the

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<sup>231</sup> Michael Salter, ‘Reinterpreting Competing Interpretations of the Scope and Potential of the Martens Clause’ (2012) 17(3) Journal of Conflict and Security Law 403, 412.

<sup>232</sup> Ibid 417.

<sup>233</sup> *Prosecutor v Kupreškić et al* (Trial Judgment) ICTY IT-95-16-T (14 January 2000).

<sup>234</sup> Ibid para. 525. The interpretation of the Martens Clause taken in this case was also highlighted in Patrick Leisure, ‘The Martens Clause, Global Pandemics, and the Law of Armed Conflict’ (2021) 62(2) Harvard

consideration of the Martens Clause as an interpretative aide. For example, labelling the Martens Clause as an interpretative aide could be construed as rendering its use and application optional. Thus, this would mean that judges who prefer a “positivistic and/or ‘black letter’ orientation, which is hostile to the deployment of morally leaded ideas within legal decision-making, can simply ignore with impunity.”<sup>235</sup> The consideration of the Martens Clause as an interpretative aide, while the approach adopted by the ICTY, could render the application of the principle of humanity as optional, which is far from the purpose that the ancient principle was intended to serve.

### 2.5.3 The Martens Clause as a Legal Norm

In comparison, a very broad interpretation of the Martens Clause would be its interpretation as creating an independent legal norm in its own right.<sup>236</sup> This is arguably “the most expansive and far-reaching construction”<sup>237</sup> applicable to the Martens Clause, but it arises from the notion that humanitarian values had not been solidified in many international legal instruments prior to the 1899 Hague Convention. Therefore, it is often considered that the Martens Clause gave the principles of humanity their legal normativity and is itself an independent source of law. The ICTY case of *Martić*<sup>238</sup> is often cited in support of this broad interpretation. In prosecuting Martić for ordering the shelling of

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Journal of International Law 469, 484: “[t]his view posits that where an existing rule of IHL is not “sufficiently rigorous or precise,” the Martens Clause allows tribunals to consider the principles of humanity and the dictates of the public conscience in making their decision”.

<sup>235</sup> Michael Salter, ‘Reinterpreting Competing Interpretations of the Scope and Potential of the Martens Clause’ (2012) 17(3) Journal of Conflict and Security Law 403, 420.

<sup>236</sup> See Patrick Leisure, ‘The Martens Clause, Global Pandemics, and the Law of Armed Conflict’ (2021) 62(2) Harvard Journal of International Law 469, 478: “[i]n contrast, the broadest interpretation maintains that the Clause contains stand-alone preemptory norms of international law.” See also Vladimir V. Pustogarov, ‘The Martens Clause in International Law’ (1999) 1 Journal of the History of International Law 125, 134: “[i]n international humanitarian law, the Martens clause is a particular norm, moreover a norm of jus cogens.”

<sup>237</sup> Michael Salter, ‘Reinterpreting Competing Interpretations of the Scope and Potential of the Martens Clause’ (2012) 17(3) Journal of Conflict and Security Law 403, 421.

<sup>238</sup> *Prosecutor v Milan Martić* (Judgment) ICTY IT-95-11-T (12 June 2007).

Zagreb with a form of cluster munitions, which resulted in numerous civilian casualties, Article 3 of the ICTY Statute<sup>239</sup> did not sufficiently cover his prosecution for his choice of weapon. Thus, the ICTY held that “the general principle limiting the means and methods of warfare also derive from the Martens Clause.”<sup>240</sup> Thus, in this instance, it is the Martens Clause which is viewed to have given the principle of humanity its legal normativity. However, it argued that it was not the application of the Martens Clause, but rather the principles of humanity to which the Clause refers, which has a historic legal significance pre-dating the Martens Clause, as illustrated in Section 2.2. This is re-iterated by Evans, who stated that the Martens Clause did not create the principles of humanity, but rather aimed “to preserve the customary rules that were in effect before the codification of the Hague Conventions and which were not named in those treaties.”<sup>241</sup> Evans’ interpretation is seen in the ICJ *Corfu Channel Case*,<sup>242</sup> wherein the court recognised obligations arising out of “certain general and well-recognized principles, namely: elementary considerations of humanity”<sup>243</sup> as opposed to specific obligations arising out of the 1907 Hague Convention. Therefore, the principle of humanity was seen to apply in the absence of legislation. Thus, while this broad interpretation escalates the significance of the Martens Clause, in doing so it diminishes and disregards the legal standing of the principle of humanity prior to the enactment of the Martens Clause. It is the rich and historic recognition on a universal level, as outlined in Section 2.2, which highlights the importance of the principle of humanity in IHL. The principle of humanity is expressly incorporated into IHL instruments in the Martens Clause and this clause also

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<sup>239</sup> UN Security Council, Statute of the International Criminal Tribunal for the Former Yugoslavia (signed 25 May 1993, amended 17 May 2002) (1993 Statute of the International Criminal Tribunal for the Former Yugoslavia) art 3.

<sup>240</sup> *Prosecutor v Milan Martić* (Judgment) ICTY IT-95-11-T (12 June 2007) 5.

<sup>241</sup> Tyler D. Evans, ‘At War with the Robots: Autonomous Weapon Systems and the Martens Clause’ (2013) 41 *Hofstra Law Review* 697, 713.

<sup>242</sup> *Corfu Channel Case (United Kingdom v Albania)* (Mertis) [1949] ICJ Rep 4.

<sup>243</sup> *Ibid* 22.

grants the principle the role of providing guidance and protection in cases not expressly dealt with in IHL, as is currently the case with the gap in the regulation of weapons in Outer Space. However, the principle of humanity exists in IHL separate to the Martens Clause and is foundational in IHL. It is this foundational nature of the principle of humanity that makes it the appropriate lens from which to form recommendations for the regulation of the use of weapons in Outer Space.

#### **2.5.4 The Martens Clause and Interpretative Uncertainty**

These varying interpretations of the Martens Clause and the principle of humanity have caused much uncertainty surrounding the role they have to play in IHL. This uncertainty is clear in the ICJ Advisory Opinion on the *Legality of the Threat or Use of Nuclear Weapons*<sup>244</sup> wherein the “submissions to the ICJ and the resulting Opinion made considerable reference to the Martens Clause”,<sup>245</sup> with varying interpretations of the clause being cited. For example, in his dissenting opinion, Judge Shahabuddeen described the role of the Martens Clause as allowing one “to view the laws of humanity and the dictates of the public conscience as principles of international law”.<sup>246</sup> This interpretation is the closest to a textual and neutral interpretation of the scope of the principle of humanity in IHL. Despite the lack of consensus reached in this decision, the Martens Clause was collectively recognised by all judges as “an effective means of addressing the rapid evolution of military technology.”<sup>247</sup> Therefore, even in the midst of confusion regarding the exact interpretation of the Martens Clause and the principle of humanity in

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<sup>244</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996.

<sup>245</sup> Rupert Ticehurst, ‘The Martens Clause and the Laws of Armed Conflict’ (1997) 317 *International Review of the Red Cross* < <https://www.icrc.org/en/doc/resources/documents/article/other/57jnhy.htm>> accessed 26 September 2023.

<sup>246</sup> Vladimir V. Pustogarov, ‘The Martens Clause in International Law’ (1999) 1 *Journal of the History of International Law* 125, 129.

<sup>247</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996, para 78.

this case, the modern significance of both in IHL was re-iterated by the judges. While the specific application of the principle of humanity to the emergence of new weapons technologies is discussed further in the conclusions and recommendations in Chapter 7, it is important to highlight that even in a decision where the interpretations of the Martens Clause clashed, the lack of clarity on the matter was not noted as negating the continued relevance of the Martens Clause in IHL today.

While the vague wording of the Martens Clause, combined with the abstract concept of the principle of humanity itself, are often interpreted as failings in comparison to the clearly-defined principles of distinction, military necessity and proportionality, the principle of humanity still remains central to IHL. Despite the varying interpretations of the Martens Clause in the jurisprudence of the ICTY outlined above, the tribunal's case law has also highlighted the significance of the principle of humanity in IHL. For example, the principle of humanity was referenced in the *Furundžija*<sup>248</sup> case, wherein it was stated that “[t]he general principle of respect for human dignity is the basic underpinning and indeed the very *raison d’être* of international humanitarian law”.<sup>249</sup> Thus, while varying interpretations of the Martens Clause may appear to limit the application and significance of the principle of humanity, the centrality of this principle continues to be recognised by international legal institutions.

The interpretations of the Martens Clause and with it, the principle of humanity, may cause uncertainty, but as Salter notes, the current task facing modern IHL is not “to interpret this measure in a way that was ‘originally intended’...but rather how to remain broadly consistent with the implications of patterns of past and present judicial and other

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<sup>248</sup> *Prosecutor v Anto Furundžija* (Trial Judgment) ICTY IT-95-17/1-T (10 December 1998).

<sup>249</sup> *Ibid* para 183.

authoritative deployments of this measure.”<sup>250</sup> Therefore, regardless of the specific interpretations of the Martens Clause or the principle of humanity adopted in the past, it is important to keep modern interpretations tailored to the challenges arising today and in the future in IHL which the principle of humanity can address. This is evident from the focus of weapons use in Outer Space in this research because the lack of express regulation of weapons use in this domain in both the IHL and ISL frameworks is currently addressed by the Martens Clause. This illustrates the relevance of the Martens Clause to one of the most modern issues of weapons regulation and as Chapter 6 discusses, the prospect of future ‘Space weapons’ will pose future need for the Martens Clause and the principle of humanity. The next section will demonstrate that the Martens Clause and the principle of humanity which will continue to be called upon to prompt legislative change in IHL and it is this role which allows the principle of humanity to remain relevant from historic times up to today and into the future.

## **2.6 Continued Relevance of the Martens Clause**

Crawford poses the question as to whether “the Martens Clause actually contain[s] anything of enduring legal significance”?<sup>251</sup> This chapter has illustrated that the Martens Clause, by enshrining the principle of humanity in IHL treaty-law, indeed has much enduring significance in modern IHL, despite the vagueness of its terms or its varying interpretations.

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<sup>250</sup> Michael Salter, ‘Reinterpreting Competing Interpretations of the Scope and Potential of the Martens Clause’ (2012) 17(3) *Journal of Conflict and Security Law* 403, 412.

<sup>251</sup> Emily Crawford, ‘The Modern Relevance of the Martens Clause’ (2006) 6 *ISIL Yearbook of International Humanitarian and Refugee Law* 1, 2.

The importance of the Martens Clause is further consolidated by the fact that law-making takes a lengthy period of time to concretise, as noted by Pictet.<sup>252</sup> The Martens Clause allows the protection offered by the principle of humanity to act “as a gap-filler for those areas of international humanitarian law that are not clear-cut”<sup>253</sup> in the absence of express legislative instruments. Therefore, the Martens Clause, incorporated into many instruments, as outlined in Section 2.4, allows for the considerations of the principle of humanity to provide a base level of protection in all circumstances of armed conflict for which express legislation has yet to be developed.

As previously noted, the ICJ also recognised the usefulness of the Martens Clause in addressing the emergence of new weapons technologies.<sup>254</sup> This is due to the fact that under considerations of reduction of unnecessary suffering, certain weapons technologies are restricted or banned outright from use in armed conflict situations. These limitations are placed on the development of weapons which do not comply with the principle of humanity in the sense that their purpose is not purely “for the attainment of a definite military advantage”.<sup>255</sup> For example, this is one of the rationales behind the prohibition of expanding bullets,<sup>256</sup> blinding laser weapons,<sup>257</sup> and cluster munitions.<sup>258</sup> However, while these weapons have been prohibited by means of legislation, science constantly creates new weapons which warrant prohibition in the absence of express legislation. As

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<sup>252</sup> Jean Pictet, *Development and Principles of International Humanitarian Law* (Martinus Nijhoff Publishers 1985) 59-60.

<sup>253</sup> Larry May, ‘Hobbes, law, and public conscience’ (2016) 19(1) *Critical Review of International Social and Political Philosophy* 12, 24.

<sup>254</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996, para 78.

<sup>255</sup> Rupert Ticehurst, ‘The Martens Clause and the Laws of Armed Conflict’ (1997) 317 *International Review of the Red Cross* < <https://www.icrc.org/en/doc/resources/documents/article/other/57jnh.htm>> accessed 26 September 2023.

<sup>256</sup> Declaration (IV,3) concerning Expanding Bullets (adopted 29 July 1899, entered into force 4 September 1990) (1899 Hague Declaration (IV, 3)).

<sup>257</sup> Protocol on Blinding Laser Weapons, 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 (adopted 13 October 1995, entered into force 30 July 1998) 1380 UNTS 370 (1995 Protocol IV to the 1980 Convention on Certain Conventional Weapons).

<sup>258</sup> 2008 Convention on Cluster Munitions.

Ticehurst outlines, “there can be a delay between ‘advances’ in military technology and the development of normative standards to control or prohibit the use of those military advances.”<sup>259</sup> It is this gap that continues to be filled today by the Martens Clause and the principle of humanity. This is evident in the case of weapons use in Outer Space, the topic of this research. At the intersection of the ISL and IHL frameworks, only the placement of nuclear weapons and weapons of mass destruction in Outer Space, as well as the testing of weapons on celestial bodies, is expressly prohibited.<sup>260</sup> This has resulted in a gap with regards to the regulation of the use of other weapons in the Outer Space environment. This gap is currently addressed by the Martens Clause and the principle of humanity enshrined therein.

The broad wording of the Martens Clause and the flexible nature of the principle of humanity are often criticised for creating lack of certainty in IHL, as mentioned in Section 2.5. However, it is this broad wording which provides “sufficient scope for creative judicial development and progressive application of its principles to new, and possibly unforeseen, contexts.”<sup>261</sup> It is for this reason that the Martens Clause and the principle of humanity can apply to the gaps in the IHL framework and provide a minimum standard of protection for the foreseeable future. Thus, the characteristics that are often highlighted as the shortcomings of the Martens Clause and the principle of humanity (i.e., broad wording causing uncertainty of interpretation), have also proven to be their strengths.

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<sup>259</sup> Rupert Ticehurst, ‘The Martens Clause and the Laws of Armed Conflict’ (1997) 317 *International Review of the Red Cross* < <https://www.icrc.org/en/doc/resources/documents/article/other/57jnhy.htm>> accessed 26 September 2023. See also Tara Smith, ‘Challenges in identifying binding Martens Clause rules from the ‘dictates of public conscience’ to protect the environment in non-international armed conflict’ (2019) 10(2) *Transnational Legal Theory* 184, 185: “[a]s methods and means of warfare evolve all the time, often rapidly the Martens Clause remains relevant because it is impossible for international law to keep pace with this rate of change.”

<sup>260</sup> 1967 Outer Space Treaty, art IV.

<sup>261</sup> Michael Salter, ‘Reinterpreting Competing Interpretations of the Scope and Potential of the Martens Clause’ (2012) 17(3) *Journal of Conflict and Security Law* 403, 406.

It is this utility of the Martens Clause and its solidification of the principle of humanity which arguably demonstrates that the clause indeed includes much enduring legal significance. This significance in IHL is the reason that the principle of humanity is the perspective for this research, as is discussed in the following section.

## **2.7 The Principle of Humanity – Continued Role**

This chapter outlines the significant history of the principle of humanity and its continued role and relevance in IHL through its inclusion in the Martens Clause. As Section 2.5 notes, the broad phrasing of the Martens Clause and the undefined nature of the principle of humanity, while facilitating the flexibility necessary to fill gaps in IHL in unforeseen circumstances, can lead to differing interpretations and exactness with application. However, the necessity of the broad nature of the Martens Clause and the difficulties associated with this does not diminish the central role of the principle of humanity in IHL – in historic practices as well as in response to modern IHL challenges.

This research submits that because the principle of humanity is central to and underpins the entire substance of IHL, it is the appropriate lens from which to analyse the current IHL and ISL frameworks, the current situation of weaponisation in Outer Space and the formation of recommendations for the regulation of weapons use in Outer Space. The perspective of the principle of humanity roots the descriptive analysis of this research, and the normative recommendations that are derived from this analysis, firmly in the foundation of IHL.

With the substance of IHL – historic practices and beliefs, the other three core principles, treaty law, custom, etc. - all stemming from the objective of reducing unnecessary suffering and maintaining humanity in times of armed conflict, it follows that recommendations for a new weapons regulation instrument in IHL should also be

informed by research carried out from this perspective. This is the objective that this research aims to achieve by adopting the principle of humanity as the lens for analysis.

## **2.8 Conclusion**

The principle of humanity is established as being the foundational principle of IHL. The principle has been the basis for early iterations of limitations on armed conflicts in history, as outlined in Section 2.1. Section 2.2 outlines the definition of the principle of humanity that this research adopts, which focuses on the reduction of unnecessary suffering as much as possible in armed conflict situations. Section 2.2 also highlights how other interpretations of ‘humanity’ such as that of humankind or a sense of morality also serve to inform the understanding of reduction of unnecessary suffering in IHL, particularly in regard to regulating the use of weapons in Outer Space, where the suffering could be experienced by humankind as a whole. Section 2.3 discusses the express inclusion of the principle of humanity in IHL instruments through the Martens Clause of 1899 Hague Convention II and its role as providing a minimum standard of protection in instances not expressly provided for in IHL instruments. Section 2.4 illustrates that the Martens Clause has been continually included in the majority of IHL instruments thereafter, as well as establishing that the principle of humanity also exists independently in IHL. Section 2.5 outline the interpretations of the Martens Clause and the principle of humanity that have been adopted due to the broad nature of its wording and purpose. Finally, Sections 2.6 and 2.6 describe how the clause and the principle respectively have continued significance in IHL.

This chapter establishes the centrality of the principle of humanity in IHL, in its own right and through the Martens Clause, and the importance that its considerations of the limitation of unnecessary suffering during armed conflict has in IHL. The principle of

humanity, the concept from which all IHL has derived, is the strongest perspective from which to analyse and form recommendations for future weapons regulation, as is the aim of this research. It is for this reason that the principle of humanity, as outlined in this chapter, is the perspective that has been adopted in this descriptive-normative research. This chapter contributed towards the research question by establishing this centrality of the lens of the principle of humanity in IHL, historically and in modern times, but also highlighting the broader understanding of 'humanity' that helps to inform this lens. For example, the formation of recommendations for the use of weapons in Outer Space require consideration to be paid to humankind as a whole who is at risk if the use of weapons in Outer Space occurs unregulated. Furthermore, the principle of humanity's role as allocated in the Martens Clause of addressing issues that are not expressly dealt with in IHL instruments is important at present in Outer Space. The gap with regards to regulation of the use of weapons in Outer Space is addressed by the Martens Clause and a minimum standard of protection provided. It is for these reasons that the principle of humanity is the appropriate lens for the analysis of this research and its formation of recommendations for the use of weapons in Outer Space.

This chapter establishes the rationale behind the choice of the principle of humanity in IHL as the lens of this research and the role that this principle has in weapons regulation, contributing to research sub-question three and the central research question of this thesis. The following two chapters focus on the body of law that is IHL and the regulation of weapons within the IHL framework. Both Chapter 3 and Chapter 4 contribute towards research sub-questions one and two by outlining one of the frameworks (with the other being the ISL framework) that regulates the use of weapons in Outer Space.

## Chapter 3: Regulating Conflict

### 3.0 Introduction

The lens of this research, that of the principle of humanity in IHL, is established as central to IHL and the definition that this research adopts for this principle is that of a focus on limiting the means and methods of warfare that can be used during an armed conflict and reducing unnecessary suffering and superfluous injury during armed conflicts. These elements of the principle of humanity are central to the body of law that regulates armed conflict – that of IHL. IHL, which as Chapter 2 outlines, has a significant history, and is seen to place limitations on conduct during armed conflict in order to maintain a standard of ‘humane’ behaviour even during wartime. As this chapter describes, the aims of IHL are to provide protection for those who are not actively participating in hostilities<sup>1</sup> and to limit the means and methods of warfare.<sup>2</sup> The body of IHL includes treaty-law, case law, customary IHL and in more recent times, non-binding soft-law instruments. This chapter, through establishing the role and the content of IHL, not only outlines the framework within which the regulation of weapons is located which is the legal framework that is relevant to research sub-questions one and two, but also provide context for the formation of recommendations for a weapons regulation instrument. The discussion of the means of regulation adopted in IHL, such as hard law or soft law is discussed, which informs the recommendations of this research for regulation of the use of weapons in Outer Space.

In this chapter, Section 3.1 introduces the IHL or *jus in bello* framework and its characteristics. IHL is distinguished from the related but separate bodies of law of *jus ad bellum* and *jus post bellum*, as well as introducing the principles of IHL, the categories of Hague Law and Geneva Law and the equal application of IHL to belligerents. Section 3.2

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<sup>1</sup> See the 1949 Geneva Conventions I-IV.

<sup>2</sup> See 1977 Additional Protocol I, art 35(1): “[i]n any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited.”

discusses case law of IHL and its role in the IHL framework. Section 3.3. then examines the formation of customary IHL and the importance of customary IHL in providing IHL obligations that apply to all States. Finally, Section 3.4 examines non-binding soft law and the arguments for and against its inclusion in international law including IHL. The analysis of this chapter provides crucial understanding of the IHL framework, which is one the legal frameworks that deal with the regulation of the use of weapons in Outer Space, which research sub-questions 1 and 2 of this research highlight. Furthermore, understanding of the IHL framework and the forms of law included within it informs the recommendations that this research makes.

### **3.1 IHL**

While Cicero writes “inter arma silent leges” (in time of war the law is silent), the history of the principle of humanity illustrated in Chapter 2 shows that the limiting of unnecessary suffering in times of conflict has long existed and thus, restriction and regulation in armed conflict does exist. Crawford and Pert note that despite Art 2(4) of the UN Charter<sup>3</sup> banning the use of force, it is “recognised that armed conflicts may yet occur”<sup>4</sup> and during armed conflict situations it is IHL, or the law of armed conflict, that applies to regulate the conduct of hostilities.

There are two types of armed conflict to which IHL applies – international armed conflicts (IACs) and non-international armed conflicts (NIACs). IACs are conflicts that occur between States, while NIACs are conflicts that occur between States and a non-State

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<sup>3</sup> Charter of the United Nations (signed 26 June 1945, adopted 24 October 1945) 1 UNTS XVI (1945 Charter of the United Nations) art 2(4)

<sup>4</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 32.

armed group or between only non-State armed groups.<sup>5</sup> The categorisation of which conflict is occurring in a particular situation is important as it determines what IHL can apply. All IHL provisions of the 1949 Geneva Conventions<sup>6</sup> and 1977 Additional Protocol I<sup>7</sup> can apply to IACs, while common Article 3 of the Geneva Conventions<sup>8</sup> and Additional Protocol II<sup>9</sup> apply to NIACs. In regard to weapons regulation as the focus of this research, many of the provisions that deal with the limitation or prohibition of specific means and methods of warfare have become part of customary IHL, which applies to NIACs as it does IACs.

In relation to this research and the hostilities, and thus, weapons use, that could occur in Outer Space, they would likely be IACs. Although, as discussed in Chapter 6, the efforts of private actors have propelled forward the prospect of more individuals being present in Outer Space. Thus, a NIAC is not completely out of the realm of possibilities but remains highly unlikely with the current state of Outer Space activities.

This section will discuss IHL and its role in armed conflict situations, as well as its aims that are important for the purpose of this research. This analysis of IHL, prior to the investigation of the sources of IHL later in the chapter, contributes to the answering of the research questions of this thesis as research sub-questions 1 and 2 focus on the legal regime that regulates the use of weapons in Outer Space and the gap in this legal regime.

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<sup>5</sup> See Robert Kolb, *Advanced Introduction to International Humanitarian Law* (Edward Elgar Publishing Limited 2014) 22: “[t]oday, there are two basic types of armed conflicts, to which a certain number of identical and a certain number of differentiated rules apply. One type is IAC (armed conflict between States), the other is NIAC (armed conflicts between governmental forces and insurgents or between armed groups).” See also Marco Sassòli, Antoine A Bouvier and Anne Quintin, *How Does Law Protect in War? Cases, Documents and Teaching Materials on Contemporary Practice in International Humanitarian Law Volume I* (3<sup>rd</sup> edn, ICRC 2011) Part I, Chpt 2, 21: “IHL applies in two very different types of situations: international armed conflicts and non-international armed conflicts.”

<sup>6</sup> 1949 Geneva Conventions I- IV.

<sup>7</sup> 1977 Additional Protocol I.

<sup>8</sup> 1949 Geneva Conventions I - IV, art 3.

<sup>9</sup> 1977 Additional Protocol II.

### 3.1.1 Jus Ad Bellum, Jus in Bello and Jus Post Bellum

The following sub-section highlights the different terms used to describe the body of law that is IHL. However, this sub-section focuses on the distinction of IHL, referred to in Latin as *jus in bello*, from the related bodies of law of *jus ad bellum* and *jus post bellum*. All three bodies of law deal with armed conflicts, but at different times of the conflict and they focus on the regulation of different issues.

IHL is also often referred to as *jus in bello* (rights in war). This term is often juxtaposed with that of *jus ad bellum* (right to wage war).<sup>10</sup> The two terms refer to what we recognise today as two different but related bodies of law, with *jus in bello* being the law outlined in the IHL framework, while *jus ad bellum* is the body of law that deals with the prohibition on the use of force, outlined in Art 2(4) of the UN Charter,<sup>11</sup> with exceptions to this prohibition including the right to self-defence provided for in Art 51 of the UN Charter<sup>12</sup> alongside other actions provided for in Chapter VII.<sup>13</sup> The development of weapons regulation is dealt with in IHL and thus, it is this body of law that is the primary focus of this research.

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<sup>10</sup> James Morwood, *Pocket Oxford Latin Dictionary: Latin-English* (3<sup>rd</sup> edn., Oxford University Press 2012) <<https://www-oxfordreference-com.may.idm.oclc.org/display/10.1093/acref/9780191739583.001.0001/b-la-en-00001-0005574?rskey=OOFqkw&result=2> > accessed 11 May 2023 - *iūs* meaning “law; right; authority; court of justice; code; (war) conventions”. Ibid <<https://www-oxfordreference-com.may.idm.oclc.org/display/10.1093/acref/9780191739583.001.0001/b-la-en-00001-0001244?rskey=39GLEu&result=1> > accessed 11 May 2023 - *bellum* meaning “war; combat, fight”. Ibid <<https://www-oxfordreference-com.may.idm.oclc.org/display/10.1093/acref/9780191739583.001.0001/b-la-en-00001-0000195?rskey=J4Y921&result=1> > accessed 11 May 2023 – *ad* meaning “to...”. Ibid <<https://www-oxfordreference-com.may.idm.oclc.org/display/10.1093/acref/9780191739583.001.0001/b-la-en-00001-0004895?rskey=L4400e&result=1> > accessed 11 May 2023 – *in* meaning “to; into; against; for; towards; until; at; in; on; within; among”.

<sup>11</sup> UN Charter, art 2(4): “[a]ll 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.”

<sup>12</sup> Ibid art 51: “[n]othing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security. Measures taken by Members in the exercise of this right of self-defence shall be immediately reported to the Security Council and shall not in any way affect the authority and responsibility of the Security Council under the present Charter to take at any time such action as it deems necessary in order to maintain or restore international peace and security.”

<sup>13</sup> Ibid chpt VII: “Action with Respect to Threats to the Peace, Breaches of the Peace, and Acts of Aggression.”

However, the differentiation between the terms *jus ad bellum* and *jus in bello* is relatively recent despite the history of IHL, some of which is discussed in Chapter 2. According to Kolb, *jus in bello*, alongside the term *jus ad bellum*, “were only coined at the time of the League of Nations and were rarely used in doctrine or practice until after the Second World War, in the late 1940s to be precise.”<sup>14</sup> This coincides with the adoption of the Geneva Conventions<sup>15</sup> in 1949. Sassòli and Nagler describe the separation of *jus in bello* from *jus ad bellum* as “[p]erhaps the most important principle for IHL”.<sup>16</sup> It is *jus ad bellum* that focuses on the choice to enter into an armed conflict. This body of law has a significant history itself, with much focus given to whether a party starting an armed conflict had a ‘just’ cause to do so. This is a significant distinction between *jus ad bellum* and IHL, because, as is discussed later in this section, the rights and obligations regarding the conduct of armed conflict apply to all parties to the conflict, regardless of whether they had a ‘just’ cause to enter war or not.

Another related but distinct body of law to those mentioned is that of *jus post bellum*, which refers to the “principles [that] govern the aftermath of war”.<sup>17</sup> Thus, *jus post bellum* applies when armed conflict has ceased. *Jus post bellum* could entail responsibilities involving the return of prisoners of war, the requirement to put institutions in place to rebuild post-war stability, etc. Bass notes with respect to this body of law that “[m]uch less has been said about what happens after a war. But the after- math of war is crucial to the justice of the war itself.”<sup>18</sup>

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<sup>14</sup> Robert Kolb, ‘Origin of the Twin Terms *jus ad bellum*/*jus in bello*’ (1997) 37(320) *International Review of the Red Cross* 553.

<sup>15</sup> 1949 Geneva Conventions I – IV.

<sup>16</sup> Marco Sassòli and Patrick S Nagler, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar Publishing 2019) 18.

<sup>17</sup> Colleen Murphy, ‘Minimum Moral Threshold At War’s End’ in Graham Parsons and Mark Wilson (eds), *How to End a War: Essays on Justice, Peace and Repair* (Cambridge University Press 2023) 94.

<sup>18</sup> Gary J Bass, ‘Jus Post Bellum’ (2004) 32(4) *Philosophy & Public Affairs* 384.

Thus, while these bodies of law are related to armed conflicts, it is IHL, as the law of war that regulates the conduct of armed conflicts that is the focus of this research. The regulation of weapons use applies from the beginning until the cessation of hostilities. It is the regulation of weapons use in Outer Space for which this research forms recommendations. Having established the body of law that is IHL which this research focuses on as the legal regime, alongside ISL, that applies to weapons regulation in Outer Space and in which a gap with regards to this weapons regulation exists, the terms used to refer to IHL will be discussed in the following sub-section.

### **3.1.2 *Jus in bello*/Law of Armed Conflict (LOAC)/IHL**

The terms to refer to the body of law that applies during armed conflicts - *jus in bello*, the law of armed conflict and international humanitarian law are often used interchangeably, as is seen earlier in this chapter. This research predominantly uses IHL to refer to the body of international law that applies during armed conflicts. IHL is also one of the bodies of law, with ISL being the other body of law, which forms the legal regime that regulates the use of weapons in Outer Space.

The introduction of the different terms' use for IHL came at different periods in time. For example, Alexander highlights that “[p]rior to the 1960s, the term ‘international humanitarian law’ was not used to describe a field of law...Before this period, common and academic usage referred first to the ‘laws of war’”.<sup>19</sup> Kolb also recognises the use of LOAC prior to that of IHL, stating that instruments prior to the 1949 Geneva Conventions<sup>20</sup> should be referred to as the ‘laws of war’ because “the humanitarian side

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<sup>19</sup> Amanda Alexander, ‘A Short History of International Humanitarian Law’ (2015) 26(1) *The European Journal of International Law* 109, 114 it is noted that “[d]espite the widespread acceptance of these long histories of international humanitarian law, both the term ‘international humanitarian law’ and the particular conceptualization of the *jus in bello* that it evokes are fairly new.”

<sup>20</sup> 1949 Geneva Conventions I – IV.

of the law was mainly stressed after 1949”.<sup>21</sup> With regards to *jus in bello*, alongside *jus ad bellum*, Kolb expresses that these terms “were only coined at the time of the League of Nations and were rarely used in doctrine or practice until after the Second World War, in the late 1940s to be precise.”<sup>22</sup>

In addition, Solis highlights the importance of semantics within the terms themselves. For example, he notes that “[t]here have been *rules* for the battlefield for thousands of years, but, with significant exceptions, there have been *laws* for the battlefield – LOAC – only in the past hundred years or so.”<sup>23</sup> Thus, some of the historical practices limiting suffering in early armed conflicts that are outlined in Chapter 2 would only be considered as rules because they weren’t legally binding in the sense that they would incur repercussions. Rather they were considered as more mutually accepted practices.

As noted, the term adopted by this research to refer to the legal framework is the more modern term of IHL, but as the previous sub-section illustrates this term is used interchangeably with and equated with that of *jus in bello*. The principles central to IHL, as well as the objectives of the body of law itself, including that of limiting the means and methods of warfare and regulating the use of weapons, which is the focus of this research, are discussed in the following sub-sections. The principles and objectives of IHL contribute to the understanding of the legal regime that currently regulates the use of weapons in Outer Space. Furthermore, the sources of IHL that are discussed later in this chapter inform the recommendations that this research forms and the form of the weapons regulation instrument that is recommended.

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<sup>21</sup> Robert Kolb, *Advanced Introduction to International Humanitarian Law* (Edward Elgar Publishing Limited 2014) 2.

<sup>22</sup> Robert Kolb, ‘Origin of twin terms *jus ad bellum/jus in bello*’ (1997) 320 *International Review of the Red Cross* < <https://www.icrc.org/en/doc/resources/documents/article/other/57jnuu.htm>> accessed 22 August 2023.

<sup>23</sup> Gary D. Solis, *The Law of Armed Conflict: International Humanitarian Law in War* (Cambridge University Press 2010) 21.

### **3.1.3 Principles of IHL**

The general principles of IHL provide the basic guidelines for how the conduct of hostilities should be approached and have been enshrined in many IHL instruments.

According to Kolb, the role of the principles of IHL is as follows:

“[t]he overall picture of these general principles of IHL provides the legal operator in the area with a series of gravitational points of paramount importance for understanding and correctly applying the relevant rules. The principles make explicit the legal meaning of many detailed rules and provide the operator with an understanding of the fundamental tenets of the area of law at stake.”<sup>24</sup>

The four principles are outlined in the following sub-sections.

#### **3.1.3.1 Humanity**

As Chapter 2 emphasises, the principle of humanity, which provides the lens for the analysis and recommendations formed by this research, underpins and inspires all of IHL.

The principle of humanity seeks to ensure humane conduct during armed conflict by obliging parties to the conflict to protect injured combatants, prisoners of war and civilians. The principle also aims to mitigate against the unnecessary suffering and superfluous injury caused during armed conflict and one way in which it does so is by placing limitations on the means and methods of warfare that can be used in the conduct of hostilities.<sup>25</sup> Chapter 2 focuses on the principle of humanity as it constitutes the lens of this research, but the other principles of IHL are discussed in the following sub-sections.

They provide useful knowledge for the purpose of this research as all stem from the

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<sup>24</sup> Robert Kolb, *Advanced Introduction to International Humanitarian Law* (Edward Elgar Publishing Limited 2014) 78.

<sup>25</sup> Nicholas Tsagourias and Alasdair Morrison, *International Humanitarian Law: Cases, Material and Commentary* (Cambridge University Press 2018) 39: “‘humanise’ the conduct of war by imposing limits on the means and methods of warfare, by according protection to certain categories of persons, by requiring humane treatment of captured persons, and in general, by limiting or mitigating unnecessary suffering.”

principle of humanity and thus, all have a role to play is aiming to reduce unnecessary suffering and superfluous injury during armed conflict.

### **3.1.3.2 Distinction**

The principle of distinction, given expression in law in Art 48 of 1977 Additional Protocol I, obligates the parties involved in the conflict to “at all times distinguish between the civilian population and combatants and between civilian objects and military objectives and accordingly shall direct their operations only against military objectives”.<sup>26</sup> Thus, when considering what can be targeted and what means of weaponry can be used, the parties to a conflict must not target civilians or civilian objects.

### **3.1.3.3 Military Necessity**

The principle of military necessity permits “a belligerent to use lawful means and methods of war in order to overpower an enemy”<sup>27</sup> and was defined in the first codification of IHL that was the 1863 Lieber Code as consisting “of those measures which are indispensable for securing the ends of the war, and which are lawful according to the modern law and usages of war.”<sup>28</sup> Thus, military necessity permits the use of the military measures required to defeat the other party to conflict, but the extent of this use can be seen to be subject to limitations such as that seen in Article 52 of Additional Protocol I which notes that targets should offer a military advantage.<sup>29</sup>

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<sup>26</sup> 1977 Additional Protocol I, art 48.

<sup>27</sup> Nicholas Tsagourias and Alasdair Morrison, *International Humanitarian Law: Cases, Material and Commentary* (Cambridge University Press 2018) 39.

<sup>28</sup> 1863 Lieber Code, art 14.

<sup>29</sup> 1977 Additional Protocol I, art 52(2): “[a]ttacks shall be limited strictly to military objectives. In so far as objects are concerned, military objectives are limited to those objects which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a definite military advantage.”

### 3.1.3.4 Proportionality

The fourth principle of IHL is that of proportionality, which requires that the force that a party to an armed conflict uses should not be in excess of that which is required to achieve a particular military aim and “should not exceed the anticipated military advantage expected from the operation.”<sup>30</sup> This is seen in the provisions outlined in Art 57 of Additional Protocol I, for example the requirement to “take all feasible precautions in the choice of means and methods of attack with a view to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians and damage to civilian objects”.<sup>31</sup>

While it is the principle of humanity that provides the lens for the recommendations for weapons regulation that this research will form, the other three core principles of IHL stem from the central principle of humanity. It is clear to see that the requirements of distinction, military necessity and proportionality all seek to minimise the amount of unnecessary suffering and superfluous injury that can be caused in the conduct of hostilities and thus, they share links with the definition of humanity that this research has adopted as is outlined in Chapter 2. In this way, they contribute to this research by illustrating the core elements of the principle of humanity and its contribution to IHL.

The aim of IHL that is the primary focus of this research is that of limiting the means and methods of warfare employed by parties during an armed conflict. However, the other central aim of IHL is to provide protection for certain persons who are not actively participating in the hostilities, which is discussed in the following sub-section. The protection of injured combatants, prisoners of war and civilian populations during armed conflict situations also stems from the principle of humanity’s purpose to reduce the

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<sup>30</sup> Nicholas Tsagourias and Alasdair Morrison, *International Humanitarian Law: Cases, Material and Commentary* (Cambridge University Press 2018) 39.

<sup>31</sup> 1977 Additional Protocol I, art 57(2)(a)(ii).

unnecessary suffering of these categories of protected persons and maintain humane treatment during armed conflict. The considerations of those who could suffer the consequences of the conduct of hostilities during an armed conflict is also a consideration in this research, particularly as the consequences could impact humankind as a whole if an armed conflict, and possible weapons use, were to occur in Outer Space.

### **3.1.4 Protection of those Not Actively Participating in Hostilities**

A central role of IHL is to place limitations on the conduct of hostilities in order to protect certain categories of persons who are not actively participating in the armed conflict situation and thus, are not legitimate military targets. The inspiration to provide for such protections of those *hors de combat* in a binding legal instrument was inspired by the experience of Henry Dunant. As Chapter 2 discusses, witnessing the injured left on the battlefield after the Battle of Solferino inspired Henry Dunant to act towards the creation of protections for those not or no longer participating in hostilities during armed conflict. His efforts eventually lead to the establishment of the ICRC.

Following its formation, the ICRC held a convention “a year after America’s adoption of the Lieber Code”.<sup>32</sup> The Lieber Code served as some inspiration in terms of the codification of protections in armed conflict situations, for example, including provisions such as those on civilians whereby “[p]rivate citizens are no longer murdered, enslaved, or carried off to distant parts, and the inoffensive individual is as little disturbed in his private relations as the commander of the hostile troops can afford to grant in the overruling demands of a vigorous war.”<sup>33</sup> The outcome of the ICRC’s convention was

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<sup>32</sup> Gary D. Solis, *The Law of Armed Conflict: International Humanitarian Law in War* (Cambridge University Press 2010) 48.

<sup>33</sup> 1863 Lieber Code, art 23.

1864 Geneva Convention.<sup>34</sup> The aim of offering protection is also seen in early IHL instruments that followed such as the 1906 Geneva Convention for Injured or Sick Military Personnel<sup>35</sup> and the 1929 Geneva Conventions on Injured or Sick Military Personnel and on Prisoners of War.<sup>36</sup>

The 1949 Geneva Conventions, which as Sassòli and Nagler note, “still constitute the cornerstone of contemporary IHL”,<sup>37</sup> were introduced following the devastation of WWII. Kolb saw the placement of protection at the centre of the Geneva Conventions as a change from the predominant focus on the limitation of means and methods in the instruments that came beforehand and noted that “[t]his change was an answer to the egregious violations of the most basic humanitarian concerns by the Axis powers during World War II.”<sup>38</sup>

The four conventions outline the protections that apply during armed conflicts to certain categories of person – injured combatants (both on land and at sea),<sup>39</sup> prisoners of war,<sup>40</sup> and the civilian population.<sup>41</sup> In addition, Common Article 3 of the Geneva Conventions applies a minimum standard of protection for those not directly participating in non-international armed conflicts whereby “[p]ersons taking no active part in the hostilities, including members of armed forces who have laid down their arms and those placed *hors de combat* by sickness, wounds, detention, or any other cause, shall in all circumstances

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<sup>34</sup> 1864 Geneva Convention.

<sup>35</sup> Convention for the Amelioration of the Condition of the Wounded and Sick in Armies in the Field (adopted 6 July 1906, entered into force 9 August 1907) (1906 Geneva Convention).

<sup>36</sup> Convention relative to the Treatment of Prisoners of War (adopted 27 July 1929, not in force) (1929 Geneva Convention).

<sup>37</sup> Marco Sassòli and Patrick S Nagler, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar Publishing 2019) 37.

<sup>38</sup> Robert Kolb, *Advanced Introduction to International Humanitarian Law* (Edward Elgar Publishing Limited 2014) 13.

<sup>39</sup> 1949 Geneva Conventions I and II.

<sup>40</sup> 1949 Geneva Convention III.

<sup>41</sup> 1949 Geneva Convention IV.

be treated humanely”.<sup>42</sup> The protection provided in Common Article 3 is expanded upon by 1977 Additional Protocol II.<sup>43</sup>

The affordance of protections to those not actively participating in the conduct of hostilities is a significant aim of IHL and also is illustrative of the foundational principle of humanity in mitigating against unnecessary suffering for those that are injured, prisoners of war and civilian personnel in an armed conflict situation. While this is not the element of IHL that is the focus of this research, it serves to illustrate the centrality of the principle of humanity to this branch of law. The objective of IHL that is the focus of this research, which is the placement of limitations on the means and methods of warfare, is discussed in the following sub-section. The terms means and methods of warfare refers to what is used by parties to the conflict to achieve their military aims. It is described that “[m]eans refers to weapons and weapons launch and delivery systems whereas ‘methods’ refers to particular tactics in warfare.”<sup>44</sup> Therefore, this research undertakes an investigation of the instruments regulating the means of warfare as this provides information on this legal regime and whether it sufficiently regulates weapons use in Outer Space.

### **3.1.5 Restrictions of Means & Methods of Warfare**

The placement of restrictions on the means and method of warfare employed during armed conflicts is another important role of IHL, guided by the principle of humanity in

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<sup>42</sup> 1949 Geneva Convention I – IV, art 3.

<sup>43</sup> 1977 Additional Protocol II, art 4 re-iterates the humane treatment standard that was introduced in Common Art 3 of the 1949 Geneva Conventions I - IV, but this minimum standard of protection is expanded upon as art 7 outlines the obligations to provide care for injured personnel, art 9 provides for the protection of those carrying out medical or religious duties on the battlefield and art 13 provide for the protections afforded to the civilian population.

<sup>44</sup> Nicholas Tsagourias and Alasdair Morrison, *International Humanitarian Law: Cases, Materials and Commentary* (Cambridge University Press 2018) 174.

seeking to reduce unnecessary suffering, but also by the previously-discussed principles of distinction, military necessity and proportionality. All of these considerations should be factored into the decision of the means of warfare that a party to a conflict is going to use. As outlined in Article 35 of Additional Protocol I, “[i]n any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited”,<sup>45</sup> with this expression being provided for originally in Article 22 of the 1899 Hague Convention.<sup>46</sup> This expression of limitation is important as it clearly provides that the principle established in the *Case of the SS Lotus (France v Turkey)*,<sup>47</sup> wherein all that is not expressly prohibited by international law, is permissible, does not apply in the case of selecting means and methods of warfare.

This is further consolidated by the requirement that “[i]t is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.”<sup>48</sup> These provisions place important limitations on the freedom of parties to the conflict and while the previous section discusses the protection of those not actively participating in hostilities, the limitations on the means and methods of warfare also arguably offer a level of protection to combatants. While they are legitimate military targets and can legally be killed during armed conflict, the limitations on the means of warfare that can be employed against them seeks to mitigate against their subjection to unnecessary suffering.

While the Hague Conventions of 1899 and 1907<sup>49</sup> are recognised as instruments that are central to the limiting the means and methods of warfare within the provisions that they outline with respect to the conduct of hostilities, the IHL instruments limiting such means

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<sup>45</sup> 1977 Additional Protocol I, art 35(1).

<sup>46</sup> 1899 Hague Convention (II), art 22.

<sup>47</sup> *Case of the SS Lotus (France v Turkey)* (1927) P.C.I.J. (ser. A) No. 10 (Sept. 7).

<sup>48</sup> 1977 Additional Protocol I, art 35(2).

<sup>49</sup> 1899 Hague Convention II and 1907 Hague Convention.

and methods have increased and continue to do so today. As Chapter 4 discusses when tracing the development of weapons regulation in IHL through the legal instruments enacted, in addition to these general limitations on means and methods of warfare, IHL has witnessed the creation of instruments for specific weapons to restrict or prohibit the use of such weapons in some or all instances. This was seen in the 1868 St Petersburg Declaration which prohibited the use of explosive projectiles.<sup>50</sup> Instruments enshrining specific weapons limitations/prohibitions in IHL have applied to numerous specific weapons, such as biological,<sup>51</sup> chemical,<sup>52</sup> cluster munitions<sup>53</sup> and nuclear,<sup>54</sup> as seen in Chapter 4. All of these limitations have arisen from the principle of humanity which seeks to reduce unnecessary suffering and superfluous injury. This link between the principle of humanity and existing weapons regulation instruments further justifies the adoption by this research of the principle of humanity as the lens for the formation of recommendations for the regulation of the use of weapons in Outer Space.

As Chapter 2 outlines with respect to the principle of humanity that is foundational to IHL, the regulation of what occurs during warfare, both with respect to the protection of those *hors de combat* and the limitation of the means and methods that can be employed, has dated back to ancient civilisations. These historical practices eventually contributed to the legal framework of IHL that applies during armed conflicts and the important role that it plays in achieving its aims discussed here. The following sub-section illustrates the

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<sup>50</sup> Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight. Saint Petersburg (adopted 29 November 1868, entered into force 11 December 1868) (1868 St. Petersburg Declaration).

<sup>51</sup> Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (adopted 10 April 1972, entered into force 26 March 1975) UNTS Vol 1015 (1972 Biological Weapons Convention).

<sup>52</sup> Convention on the prohibition of the development, production, stockpiling and use of chemical weapons and on their destruction (adopted 13 January 1993, entered into force 29 April 1997) Doc. CD/CW/WP.400/Rev. 1 (1993 Chemical Weapons Convention).

<sup>53</sup> 2008 Convention on Cluster Munitions.

<sup>54</sup> Treaty on the Prohibition of Nuclear Weapons (adopted 7 July 2017, entered into force 22 January 2021) UNTS Vol 3379CN.475.2017 (2017 Treaty on the Prohibition of Nuclear Weapons).

key difference between the application of IHL and the previously-mentioned *jus ad bellum*, and that is that the cause for the resort to war is irrelevant for the application of IHL.

### **3.1.6 Equal Application of IHL**

The fact that IHL applies to all parties to an armed conflict, regardless of whether or which party breached *jus ad bellum* is expressly recognised in common article 2 of the 1949 Geneva Conventions which states that “the present Convention shall apply to all cases of declared war or of any other armed conflict which may arise between two or more of the High Contracting Parties, even if the state of war is not recognized by one of them.”<sup>55</sup> It is also outlined in the preamble of 1977 Additional Protocol I,<sup>56</sup> that “the provisions of the Geneva Conventions of 12 August 1949 and of this Protocol must be fully applied in all circumstances to all persons who are protected by those instruments, without any adverse distinction based on the nature or origin of the armed conflict or on the causes espoused by or attributed to the Parties to the conflict”.<sup>57</sup>

Equal application of IHL to all parties to the conflict is an important difference between IHL and former interpretations of *jus ad bellum* during the ‘just war’ period, wherein rights in conflict differed depending on whether belligerents were associated with those with ‘just’ cause or not. As Sassòli and Nagler note, “[r]ights afforded by international law to individuals, such as the right of a wounded person to be cared for, are not rescinded just because their State acted in contravention of international law.”<sup>58</sup>

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<sup>55</sup> 1949 Geneva Conventions I – IV, art 2.

<sup>56</sup> 1977 Additional Protocol I.

<sup>57</sup> Ibid preamble.

<sup>58</sup> Marco Sassòli and Patrick S Nagler, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar Publishing 2019) 459.

### 3.1.7 Hague Law and Geneva Law in the IHL Framework

Crawford and Pert outline that “[i]t is common in IHL literature to see reference to ‘Hague Law’ and ‘Geneva Law’.”<sup>59</sup> The instruments of IHL are divided into these two categories, with Hague Law dealing with the means and the methods of warfare and Geneva Law dealing with protections for those *hors de combat*, such as injured combatants, prisoners of war and civilians.

The names Hague Law and Geneva Law “are drawn from the locations where the major treaties of these strands were debated and adopted”.<sup>60</sup> Thus, Hague Law dealing with the means and the methods of warfare, which is the central IHL focus of this research, comes from the 1899<sup>61</sup> and 1907 Hague Conventions.<sup>62</sup> Meanwhile, Geneva Law dealing with the protection of the sick and injured, civilians and prisoners of war is derived from the previously-discussed 1949 Geneva Conventions,<sup>63</sup> as well as the original 1864 Geneva Convention.<sup>64</sup> The 1977 Additional Protocols<sup>65</sup> are the example of an instrument in which the two branches of IHL are included. For example, in Additional Protocol I, which supplements the Geneva Conventions, contains strong elements of Hague Law seen in Art 35(1), which outlines that “[i]n any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited”,<sup>66</sup> as well as the requirement for States to assess the legality of new weapons outlined in Art 36.<sup>67</sup>

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<sup>59</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 33.

<sup>60</sup> *Ibid.*

<sup>61</sup> 1899 Hague Convention II.

<sup>62</sup> 1907 Hague Convention.

<sup>63</sup> 1949 Geneva Conventions I – IV.

<sup>64</sup> 1864 Geneva Convention.

<sup>65</sup> 1977 Additional Protocols I and II.

<sup>66</sup> 1977 Additional Protocol I, art 35(1).

<sup>67</sup> *Ibid* art 36 – “[i]n the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party.”

In addition, the distinction of Hague Law and Geneva Law was recognised by the ICJ in its Advisory Opinion on *Legality of the Threat or Use of Nuclear Weapons* and was expressed as follows:

“[t]he "laws and customs of war" - as they were traditionally called - were the subject of efforts at codification undertaken in The Hague (including the Conventions of 1899 and 1907) and were based partly upon the St. Petersburg Declaration of 1868 as well as the results of the Brussels Conference of 1874. This "Hague Law" and, more particularly, the Regulations Respecting the Laws and Customs of War on Land, fixed the rights and duties of belligerents in their conduct of operations and limited the choice of methods and means of injuring the enemy in an international armed conflict. One should add to this the "Geneva Law" (the Conventions of 1864, 1906, 1929 and 1949), which protects the victims of war and aims to provide safeguards for disabled armed forces personnel and persons not taking part in the hostilities. These two branches of the law applicable in armed conflict have become so closely interrelated that they are considered to have gradually formed one single complex system, known today as international humanitarian law.”<sup>68</sup>

The “essentially nonlegal terms”<sup>69</sup> of Hague Law and Geneva Law assist in dividing the body of IHL into its varying roles and responsibilities. As this research focuses on weapons regulation, the primary area of IHL that is dealt with is that of Hague Law, which is dealt with in Chapter 4. The following sections will outline the roles of case law, customary IHL and soft law respectively as sources in the IHL framework. Examination of these sources of IHL inform this research with regards to the existing IHL framework, which provides context and understanding essential for the formation of recommendations for the regulation of the use of weapons in Outer Space.

### 3.2 IHL Case Law

While it is the ICRC that is the central body that oversees the IHL framework, it is not a court. Nevertheless, case law with regards to questions and breaches of IHL are dealt with

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<sup>68</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996, 256.

<sup>69</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 33.

by the ICJ and under international criminal law courts and tribunals. For example, Article 8 of the Rome Statute of the International Criminal Court provides for war crimes, which include “[g]rave breaches of the Geneva Conventions of 12 August 1949”,<sup>70</sup> as well as “other serious violations of the laws and customs”<sup>71</sup> applicable in both IACs and NIACs.

With regards to limitations on the means and methods of warfare as the focus of this research, cases have arisen with respect to weapons use. As is discussed in Chapter 4 in relation to nuclear weapons regulation, the ICJ offered an advisory opinion on the question of the *Legality on the Threat or Use of Nuclear Weapons*<sup>72</sup> in 1996. However, no consensus and thus, no conclusion was reached with respect to the legality of such weapons.

A case that dealt with a breach of IHL with regards to the use of weapons was the case of *Prosecutor v Martić*<sup>73</sup> that came before the ICTY in 2007, as is also mentioned in Chapter 2. The question that arose was regarding the use over the city of Zagreb of the M/87 Orkan rocket, which is “a non-guided projectile”,<sup>74</sup> carrying cluster munitions containing bomblets, which were released from the rocket and upon the cluster munitions’ contact with the ground, the bomblets would disperse indiscriminately. Thus, this was a question of whether the principle of distinction had been followed accordingly in distinguishing between the combatant and the civilian populations during the choice of the means and methods of warfare to be used. It was concluded by the court that this distinction had not occurred as the Orkan rocket “by virtue of its characteristics and the firing range in this specific instance, was incapable of hitting specific targets.”<sup>75</sup> As a result, it was found

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<sup>70</sup> 1998 Rome Statute of the International Criminal Court, art 8(2)(a).

<sup>71</sup> Ibid art 8(2)(b) and art 8(2)(e).

<sup>72</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996, para 78.

<sup>73</sup> *Prosecutor v Milan Martić* (Judgment) ICTY IT-95-11-T (12 June 2007).

<sup>74</sup> Ibid para 462.

<sup>75</sup> *Prosecutor v Milan Martić* (Judgment) ICTY IT-95-11-T (12 June 2007) 463.

that Martić had “wilfully made the civilian population of Zagreb the object of this attack.”<sup>76</sup>

This example of a case in which the breach of the principle of distinction in deciding the means and methods of warfare to be used in an armed conflict illustrates that accountability for the regulation of conflict, specifically the regulation of weapons use in conflict, can be and have been enforced in international courts and tribunals. Thus, case law does have a role to play in dealing with the non-implementation of IHL by parties to armed conflicts and while retrospectively, cases like these set a precedent and indicate to States that there have been international consequences to not abiding by the requirements of IHL during armed conflicts.

Chapter 4 examines the instruments of the IHL framework that deal with weapons regulation specifically. These instruments and the case-law discussed in this section are not the only sources of IHL. Another significant source of IHL is that of customary IHL. The following section discusses the formation of customary law and the customary IHL study that was commissioned by the ICRC, which has resulted in a database of the rules of IHL that have gained customary status. Custom is not unique to IHL – rather custom is established throughout all branches of international law and is referenced as a source of law in Art 38 of the ICJ Statute.<sup>77</sup> The customary law established with regards to Outer Space is discussed in Chapter 5.

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<sup>76</sup> Ibid para 472.

<sup>77</sup> Statute of the Court of International Justice (published 18 April 1946) (1946 ICJ Statute) art 38(1)(b): “international custom, as evidence of a general practice accepted as law”.

### 3.3 Customary IHL

While the weapons regulation provisions enshrined in the IHL instruments discussed in the previous section form a significant body of obligations; these obligations only apply to those States that have signed and ratified these instruments. This is one of the reasons that customary IHL remains significant, because once a rule has gained the status of customary IHL, it applies universally to all States.<sup>78</sup> Customary IHL develops once a law in IHL is deemed to be treated as such by States for a significant period of time and the requirements of State practice and *opinio juris*, discussed in the following sub-section, are satisfied.

#### 3.3.1 Formation of Custom

The two elements that must be identified in order to establish that an instrument or a rule of IHL has solidified into customary IHL are State Practice and *opinio juris*. It was concluded by the International Law Commission in 2018 that “[e]ach of the two constituent elements is to be separately ascertained. This requires an assessment of evidence for each element”,<sup>79</sup> and thus, the elements are dealt with separately below.

##### 3.3.1.1 State Practice

Crawford outlines that, while Judge Read in the *Fisheries (UK v Norway)* case<sup>80</sup> before the ICJ described custom as “the generalization of the practice of States”,<sup>81</sup> for the

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<sup>78</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 40: “[i]n this respect, customary international law is an important and dynamic source of IHL; its universal applicability binds States which are not party to treaties, often the case in treaty law of non-international armed conflict.”

<sup>79</sup> International Law Commission, ‘Draft conclusions on identification of customary international law’ (2018) submitted in General Assembly in report A/73/10, para 65, conclusion 3(2).

<sup>80</sup> *Fisheries (UK v Norway)* (Merits) [1951] ICJ Rep 116.

<sup>81</sup> *Ibid* 191 (Judge Read).

crystallisation of a state practice into custom, there is “an evaluation of whether the practice is fit to be accepted, and is in truth generally accepted, as law.”<sup>82</sup> With respect to state practice, “provided the consistency and generality of a practice are established, the formation of a customary rule requires no particular duration”.<sup>83</sup>

Silence on the part of States with respect to a particular practice must be differentiated from objection to the practice. For example, Crawford notes that “[s]ilence may denote either tacit agreement or a simple lack of interest in the issue.”<sup>84</sup> However, a State may exempt itself from the application of the custom or a practice that may eventually become custom by being what is known as a ‘persistent objector’, which involves express and evident rejection of the practice as opposed to silence. With respect to the persistent objector, “[e]vidence of objection must be clear, and there is a rebuttable presumption of acceptance”.<sup>85</sup> Thus, if a State has demonstrated sufficient evidence of having taken a ‘persistent objector’ stance with respect to a state practice, the law that solidifies into custom will not apply to them. Nevertheless, as long as there is consistent and general practice by States, which need not be universal, the next element that requires investigation is whether this practice is accompanied by *opinio juris sive necessitates* (an opinion of law or necessity).

### 3.3.1.2 *Opinio Juris*

Roberts and Sivakumaran describe *opinio juris* as “a belief by the acting States that they are adhering to an existing rule of law”<sup>86</sup> – essentially, States are acting in accordance

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<sup>82</sup> James Crawford, *Brownlie’s Principles of Public International Law* (9<sup>th</sup> edn., Oxford University Press 2019) 21.

<sup>83</sup> *Ibid* 22.

<sup>84</sup> *Ibid* 23.

<sup>85</sup> *Ibid* 26.

<sup>86</sup> Anthea Roberts and Sandesh Sivakumaran, ‘The Theory and Reality of the Sources of International Law’ in Malcolm D. Evans (ed) *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 95.

with the belief that a certain rule is already law and that they believe themselves to be already bound by it. Schmitt and Watts highlight how “States’ expressions of the perceived extent and content of their international legal obligations are key constitutive elements of international law”,<sup>87</sup> and these expressions of their *opinio juris*, accompanied by general and consistent state practice, could contribute to the formation of custom. In identifying *opinio juris*, it is necessary to differentiate “practice that is, or is asserted to be, legally permitted or required, as opposed to being undertaken merely out of courtesy or comity.”<sup>88</sup> To make this distinction thus requires actions to be accompanied by, as was outlined by Schmitt and Watts, expressions of *opinio juris* by States and “[a]bsent meaningful and regular expressions of *opinio juris* by States, prospective customary law founders and extant customary law stagnates.”<sup>89</sup>

Examples of such expressions of *opinio juris* are outlined by the International Law Commission as including:

“public statements made on behalf of States; official publications; government legal opinions; diplomatic correspondence; decisions of national courts; treaty provisions; and conduct in connection with resolutions adopted by an international organization or at an intergovernmental conference.”<sup>90</sup>

An additional point to highlight with respect to the formation of customary IHL is that there are “problems in accurately identifying customary international law, especially in the context of international armed conflicts.”<sup>91</sup> The general nature of State practice is often questioned as not all States engage in armed conflict. Furthermore, Crawford and Pert highlight that “the ability to accurately assess what a State does in the context of an

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<sup>87</sup> Michael N. Schmitt and Sean Watts, ‘The Decline of International Humanitarian Law *Opinio Juris* and the Law of Cyber Warfare’ (2015) 50 *Texas International Law Journal* 189, 194.

<sup>88</sup> Anthea Roberts and Sandesh Sivakumaran, ‘The Theory and Reality of the Sources of International Law’ in Malcolm D. Evans (ed), *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 96.

<sup>89</sup> Michael N. Schmitt and Sean Watts, ‘The Decline of International Humanitarian Law *Opinio Juris* and the Law of Cyber Warfare’ (2015) 50 *Texas International Law Journal* 189, 194.

<sup>90</sup> International Law Commission, ‘Draft conclusions on identification of customary international law’ (2018) submitted in General Assembly in report A/73/10, para 65, conclusion 10(2).

<sup>91</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 40.

armed conflict can be remarkably difficult. There is what a State says it does, and then what it actually does”.<sup>92</sup> These difficulties have resulted in some criticism of the establishment of customary IHL, but confirmations of customary IHL have nevertheless continued, as is illustrated in the following section. Customary IHL is important to the possibility of armed conflict and weapons use in Outer Space because there is a body of obligations that apply to States should an armed conflict occur in Outer Space, even if certain States have not signed and ratified IHL treaties. Through Article III of the Outer Space Treaty,<sup>93</sup> IHL applies to Outer Space and the content of customary IHL applies to all States should an armed conflict occur in Outer Space.

### **3.3.2 Customary IHL as Confirmed in Case Law**

As noted, it can be difficult to identify the content of customary IHL or to determine when a particular practice that States are undertaking and that is supported by *opinio juris* gains the status of customary IHL. One way in which the customary status of a particular practice can be confirmed is through its being expressly referred to as such in case law. The examples expressed below were confirmed by the international military tribunal, the ICJ and the international criminal tribunals for Rwanda and the former-Yugoslavia.

#### **3.3.2.1 International Military Tribunal**

Many early IHL instruments have been deemed to constitute customary IHL, particularly before International Criminal Courts and Tribunals where breaches of IHL were being tried as war crimes. For example, in the judgment of the International Military Tribunal

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<sup>92</sup> Ibid.

<sup>93</sup> 1967 Outer Space Treaty, art III.

(IMT) for the *Trial of German Major War Criminals*,<sup>94</sup> many of the States involved were not parties to the 1907 Hague Convention.<sup>95</sup> Nevertheless, “the IMT appeared to acknowledge that at the time...participating states believed that they were making new law...these rules laid down in the Convention were recognised by all civilised nations and were regarded as being declaratory of the laws and customs of war.”<sup>96</sup>

### 3.3.2.2 International Court of Justice

Furthermore, Meron analysed the consideration of whether the 1949 Geneva Conventions<sup>97</sup> had become customary IHL at the time of the ICJ Judgment in the case of *Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America)*.<sup>98</sup> As noted by Meron, in the conflict occurring in Nicaragua, wherein the United States were supporting the Contras,<sup>99</sup> the consideration of the 1949 Geneva Conventions in light of custom arose because “the multilateral treaty reservation of the United States appeared to preclude the ICJ from applying the Geneva Conventions as treaties. Hence the importance of the Conventions as declaratory of customary law.”<sup>100</sup> Meron notes that the ICJ did not deem itself as limited with respect to its application of IHL by the United States’ reservation and actually “took the U.S. reservation into account

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<sup>94</sup> *The Trial of German Major War Criminals: Proceedings of the International Military Tribunal sitting at Nuremberg, Germany* Part XXII. (22 August 1946 to 31 August 1946, 30 September 1946 and 1 October 1946).

<sup>95</sup> 1907 Hague Convention.

<sup>96</sup> Theodor Meron, ‘The Geneva Conventions as Customary Law’ (1987) 81(2) *The American Journal of International Law* 348, 359.

<sup>97</sup> 1949 Geneva Conventions I – IV.

<sup>98</sup> *Case Concerning Military and Paramilitary Activities In and Against Nicaragua (Nicaragua v. United States of America)* (Merits) [1986] ICJ Reports 1986, p. 14; General List No. 70.

<sup>99</sup> The contras were a United States-backed group that were seeking to over-throw the Nicaragua government. See *Case Concerning Military and Paramilitary Activities In and Against Nicaragua (Nicaragua v. United States of America)* (Merits) [1986] ICJ Reports 1986, p 21, para 20, where it is noted that “the United States Government had been giving support to the contras, a term employed to describe those fighting against the present Nicaraguan Government.”

<sup>100</sup> Theodor Meron, ‘The Geneva Conventions as Customary Law’ (1987) 81(2) *The American Journal of International Law* 348, 350.

by applying certain provisions of the Geneva Conventions as customary rather than contractual obligations.”<sup>101</sup> The Court’s analysis in the *Nicaragua*<sup>102</sup> case solidified quite early what would become widely accepted, that “the Geneva Conventions represent “in some respects a development, and in other respects no more than the expression,” of fundamental principles of humanitarian law”<sup>103</sup> and thus, form customary IHL and bind all States and actors in armed conflict situations. The customary status of the content of the 1949 Geneva Conventions was also confirmed by the ICJ in its Advisory Opinion regarding the *Legality of the Threat or Use of Nuclear Weapons*,<sup>104</sup> wherein the Geneva Conventions were deemed to constitute “intransgressible principles of international customary law”.<sup>105</sup>

It is emphasised by Meron that “[t]he International Court of Justice and the international criminal tribunals have repeatedly affirmed the universal applicability of the Geneva Conventions”<sup>106</sup> in their jurisprudence, which continues to consolidate the position of the Geneva Conventions not only in customary IHL but also as central to the functioning of modern IHL, more than seventy years after they were enacted.

### **3.3.2.3 International Criminal Tribunals for the former-Yugoslavia and Rwanda**

Droege and Giorgou note that the 1977 Additional Protocol I<sup>107</sup> gaining the status of customary IHL was assisted significantly by both the ICTY and the International Criminal

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<sup>101</sup> Ibid 352.

<sup>102</sup> *Case Concerning Military and Paramilitary Activities In and Against Nicaragua (Nicaragua v. United States of America)* (Merits) [1986] ICJ Reports 1986, p. 14; General List No. 70.

<sup>103</sup> Theodor Meron, ‘The Geneva Conventions as Customary Law’ (1987) 81(2) *The American Journal of International Law* 348, 352.

<sup>104</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996

<sup>105</sup> Ibid, subsection 179.

<sup>106</sup> Theodor Meron, ‘The Geneva Conventions and Public International Law British Foreign and Commonwealth Office Conference commemorating the 60th Anniversary of the 1949 Geneva Conventions, London, 9 July 2009’ (September 2009) 91(875) *International Review of the Red Cross* 619, 625.

<sup>107</sup> 1977 Additional Protocol I.

Tribunal for Rwanda (ICTR), as well as “the engagement of a new generation of practitioners and academics with a strong humanitarian background and interest.”<sup>108</sup> In *Tadić*,<sup>109</sup> “the ICTY Appeals Chamber interpreted the ICTY statute as granting the tribunal jurisdiction not only on grave breaches committed in the context of IACs, but also on other violations of IHL, including potential war crimes committed in NIAC”.<sup>110</sup> This interpretation was confirmed by the ICTR in the *Akayesu* case.<sup>111</sup> These judgments were significant as “[t]he establishment of the applicability in customary international law of the principle of individual criminal responsibility for serious violations of IHL in NIAC was a crucial steppingstone in the evolution of IHL.”<sup>112</sup>

It is evident that the case law provided by the international tribunals have had a significant role to play in confirming that certain IHL instruments have gained the status of customary IHL. However, in 1995, the ICRC commissioned a study on customary IHL,<sup>113</sup> which has in recent times become a central database. This study and the resulting database established the IHL rules that have gained the status of customary IHL and thus, apply to all States in armed conflict situations, including any possible armed conflict that could occur in Outer Space.

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<sup>108</sup> Cordula Droegge and Eirini Giorgou, ‘How international humanitarian law develops’ (2022) 104(920-921) *International Review of the Red Cross* 1798, 1811.

<sup>109</sup> *Tadić Case* (Judgment) ICTY-94-1 (26 January 2000).

<sup>110</sup> Cordula Droegge and Eirini Giorgou, ‘How international humanitarian law develops’ (2022) 104(920-921) *International Review of the Red Cross* 1798, 1813.

<sup>111</sup> *Prosecutor v Akayesu* (Judgment) ICTR-96-4-T, T Ch I (2 September 1998).

<sup>112</sup> Cordula Droegge and Eirini Giorgou, ‘How international humanitarian law develops’ (2022) 104(920-921) *International Review of the Red Cross* 1798, 1813.

<sup>113</sup> Michael N. Schmitt & Sean Watts, ‘The Decline of International Humanitarian Law *Opinio Juris* and the Law of Cyber Warfare’ (2015) 50 *Texas International Law Journal* 189, 196.

### 3.3.3 ICRC Study and Database on Customary International Humanitarian Law

The online database presents the results of the study of customary IHL that has become “probably the single most cited work on IHL”.<sup>114</sup> The study commissioned by the ICRC was extensive, being “carried out over a span of ten years in consultation with over 150 legal experts, the resulting Customary International Humanitarian Law study (the Study) includes three volumes of work”.<sup>115</sup> These volumes include primarily 161 rules in IHL that have been deemed to have gained the status of customary IHL, as well as commentary and outlines of “supporting practice contained in the (two-part) second volume.”<sup>116</sup> It is noted that the study has “migrated online, becoming a user-friendly database...the Study project has not actually ended, with a team of lawyers based in Cambridge continuously updating the practice section of the database (but not the rules) of the Study.”<sup>117</sup> Thus, the study and its contribution to the certainty of customary IHL remains central.

The study itself is “not without criticism”.<sup>118</sup> For example, upon release in 2005, the United States responded in a letter outlining its disagreement with “the methodology used to identify customary international law, in particular alleging the Study affords too much weight to thin or selective samples of State practice.”<sup>119</sup> However, the study has “also received praise for its contribution to the difficult task of determining customary IHL rules and has been cited in several national and international courts and tribunals, as well as in military manuals.”<sup>120</sup> Overall, the ICRC database on customary IHL is significant

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<sup>114</sup> Marco Milanovic and Sandesh Sivakumaran, ‘Assessing the Authority of the ICRC Customary IHL Study: How Does IHL Develop?’ (2022) 104(920-921) *International Review of the Red Cross* 1856, 1857.

<sup>115</sup> Michael N. Schmitt & Sean Watts, ‘The Decline of International Humanitarian Law *Opinio Juris* and the Law of Cyber Warfare’ (2015) 50 *Texas International Law Journal* 189, 196.

<sup>116</sup> Marco Milanovic and Sandesh Sivakumaran, ‘Assessing the Authority of the ICRC Customary IHL Study: How Does IHL Develop?’ (2022) 104(920-921) *International Review of the Red Cross* 1856, 1857.

<sup>117</sup> *Ibid.*

<sup>118</sup> Cordula Droege and Eirini Giorgou, ‘How international humanitarian law develops’ (2022) 104(920-921) *International Review of the Red Cross* 1798, 1814.

<sup>119</sup> Michael N. Schmitt & Sean Watts, ‘The Decline of International Humanitarian Law *Opinio Juris* and the Law of Cyber Warfare’ (2015) 50 *Texas International Law Journal* 189, 197.

<sup>120</sup> Cordula Droege and Eirini Giorgou, ‘How international humanitarian law develops’ (2022) 104(920-921) *International Review of the Red Cross* 1798, 1814.

in collectively addressing and outlining the current content of the body of law and highlighting the obligations of all States or parties to a conflict during an armed conflict. These obligations similarly would apply to parties to an armed conflict in Outer Space, should one ever occur. As this research focuses on weapons use in Outer Space, the following sub-section addresses where weapons regulation stands within customary IHL.

### **3.3.4 Weapons Regulation in Customary IHL**

With respect to the rules of weapons regulations, being the focus of this research, that are deemed to have gained the status of customary IHL in the ICRC Study, included are the taking of precautions in choice of means and methods of warfare in Rule 17,<sup>121</sup> as well as the prohibition on the use of weapons that “cause superfluous injury or unnecessary suffering”<sup>122</sup> in Rule 70.

Rule 70 illustrates the significance of these rules having gained the status of customary IHL, because while the prohibition on weapons that cause excessive injury and suffering is included in Article 35 of 1977 Additional Protocol I,<sup>123</sup> this instrument only applies to IACs. As noted in the ICRC Customary IHL database, the same was not included in 1977 Additional Protocol II,<sup>124</sup> which applies to NIACs.<sup>125</sup> The gaining of customary IHL

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<sup>121</sup> ICRC International Humanitarian Law Database, ‘Customary IHL’ < <https://ihl-databases.icrc.org/en/customary-ihl/v1> > accessed 12 May 2023, rule 17: “[e]ach party to the conflict must take all feasible precautions in the choice of means and methods of warfare with a view to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians and damage to civilian objects.”

<sup>122</sup> ICRC International Humanitarian Law Database, ‘Customary IHL’ <<https://ihl-databases.icrc.org/en/customary-ihl/v1> > accessed 12 May 2023, rule 70.

<sup>123</sup> 1977 Additional Protocol I, art 35.

<sup>124</sup> 1977 Additional Protocol II.

<sup>125</sup> ICRC International Humanitarian Law Database, ‘Customary IHL’ < <https://ihl-databases.icrc.org/en/customary-ihl/v1> > accessed 12 May 2023, rule 70: “[t]he prohibition of the use of means and methods of warfare which are of a nature to cause superfluous injury or unnecessary suffering was included by consensus in the draft of Additional Protocol II but was dropped at the last moment without debate as part of a package aimed at the adoption of a simplified text.”

status means that this rule extends to NIACs and thus, plays a significant role with respect to application of weapons regulation to NIACs.

Other weapons regulation rules seen in customary IHL include many with respect to weapons that have been prohibited in IHL instruments, including biological weapons,<sup>126</sup> chemical weapons<sup>127</sup> and blinding laser weapons.<sup>128</sup> The fact that many weapons regulation provisions have gained the status of customary IHL is important for Outer Space as these provisions apply to all States and apply to their activities in Outer Space, as per Article III of the 1967 Outer Space Treaty,<sup>129</sup> even if not specifically tailored to the Outer Space environment. This is similarly the case with regards to the customary nature of the Martens Clause, that is discussed in Chapter 2, as this currently fills the gap in the legal framework addressing the regulation of the use of weapons in Outer Space.

Overall, the role that custom has in IHL remains significant and the need for the ICRC Customary IHL Study when it was commissioned in 1995 is illustrative of this central role. While custom, alongside the IHL treaty-law instruments discussed in Section 3.2 are central hard law sources in which the development of weapons regulation has been seen, in recent times the role of non-binding or ‘soft law’ instruments has increased, as discussed in the next section. These instruments, while not binding in nature upon States that agree to their terms, can contribute to the expansion of IHL, particularly in dealing with emerging issues in armed conflict.

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<sup>126</sup> Ibid chpt 23.

<sup>127</sup> Ibid chpt 24.

<sup>128</sup> Ibid chpt 31.

<sup>129</sup> 1967 Outer Space Treaty, art III.

### 3.4 ‘Soft Law’

The central characteristic that distinguishes soft law from hard law is that while hard law is legally binding and creates binding obligations upon States, soft law is not legally binding. Thus, while a soft law instrument may be “normatively worded”,<sup>130</sup> it does not create binding legal obligations upon States parties. Guzman and Meyer highlight that it is for this reason that “[s]oft law has historically been relegated to the fringes of academic international law discourse, notwithstanding its importance in the actual practice of states...because soft law has not been seen as “real” international law.”<sup>131</sup>

Nevertheless, the use of soft law instruments in international law has increased significantly and soft law arguably forms a ‘real’ part of international legal frameworks, including IHL.<sup>132</sup> However, seeking a definition for soft law is, as noted by Crawford, “contested”<sup>133</sup> as it depends “to some extent, on how one defines ‘hard law’.”<sup>134</sup>

#### 3.4.1 Definition of Soft Law

The aims of soft law can vary from addressing a gap in the existing legal framework<sup>135</sup> to gaining consensus among parties on a new legal issue, which could eventually impact binding law by creating a stepping stone towards the creation of treaty law or eventually

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<sup>130</sup> Alan Boyle, ‘Soft Law in International Law-Making’ in Malcolm D. Evans (ed) *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 121.

<sup>131</sup> Andrew T. Guzman and Timothy L. Meyer, ‘International Soft Law’ (2010) 2(1) *Journal of Legal Analysis* 171, 180.

<sup>132</sup> Cordula Droege and Eirini Giorgou, ‘How international humanitarian law develops’ (2022) 104(920-921) *International Review of the Red Cross* 1798, 1820: “[i]n general, soft-law instruments are aimed at filling gaps in the law, providing solutions in the absence of clear law, strengthening its implementation, interpreting existing legal norms or extrapolating practical measures required to comply with existing obligations.”

<sup>133</sup> Emily Crawford, *Non-Binding Norms in International Humanitarian Law: Efficacy, Legitimacy, and Legality* (Oxford University Press 2021) 9-10.

<sup>134</sup> *Ibid.*

<sup>135</sup> Cordula Droege and Eirini Giorgou, ‘How international humanitarian law develops’ (2022) 104(920-921) *International Review of the Red Cross* 1798, 1820: “[i]n general, soft-law instruments are aimed at filling gaps in the law, providing solutions in the absence of clear law, strengthening its implementation, interpreting existing legal norms or extrapolating practical measures required to comply with existing obligations.”

solidifying into customary IHL.<sup>136</sup> There is no express definition of soft law, with arguments being made in favour of a range from hard to soft law to a recognition of legally binding instruments that are considered ‘soft’ in nature.

#### 3.4.1.1 Soft Law to Hard Law on a Spectrum

Chinkin identifies a range of soft law,<sup>137</sup> as do Abbott and Snidal, with the latter not strictly defining these forms as different from hard law, but rather stating that both hard and soft law exist on a spectrum.<sup>138</sup> The placement of specific soft law varieties along this spectrum is dependent upon the extent to which law is “weakened along one or more of the dimensions of obligation, precision, and delegation.”<sup>139</sup> This spectrum allows for a “broad class of deviations from hard law and, at the other extreme, from purely political arrangements in which legalization is largely absent”.<sup>140</sup> Such a spectrum illustrates that between the adoption of hard law or soft law, the choice “is not a binary one.”<sup>141</sup>

However, the conception of a spectrum from hard legal sources to soft ones is not universally accepted. For example, Hillgenberg highlights that

“[o]bjections have rightly been raised to the idea of a sliding scale of increasing legal commitment, according to which a genuine treaty, with all the consequences of the Vienna Convention on the Law of Treaties - and if the treaty is infringed, of state responsibility- is only the highest degree of commitment, on the grounds

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<sup>136</sup> Ibid: “[t]hese soft-law instruments have various forms and objectives and can influence later developments of treaty or custom.”

<sup>137</sup> Christine M. Chinkin, ‘The Challenge of Soft Law: Development and Change in International Law’ (1989) 38(4) *The International and Comparative Law Quarterly* 850, 851: “instruments [that] range from treaties, but which include only soft obligations (“legal soft law”), to non-binding or voluntary resolutions and codes of conduct formulated and accepted by international and regional organisations (“non-legal soft law”), to statements prepared by individuals in a non-governmental capacity, but which purport to lay down international principles.”

<sup>138</sup> Emily Crawford, *Non-Binding Norms in International Humanitarian Law: Efficacy, Legitimacy, and Legality* (Oxford University Press 2021) 15 it is noted that Abbott and Snidal “take a reasonably broad approach to defining soft law but add the qualifier that the distinction between hard law and soft law is not a rigid binary and that ‘soft law comes in many varieties.’”

<sup>139</sup> Kenneth W Abbott and Duncan Snidal, ‘Hard and Soft Law in International Governance’ (2000) 54(3) *International Organization* 421, 422.

<sup>140</sup> Ibid.

<sup>141</sup> Ibid.

that there is a difference of principle and not only of degree between a treaty and a non-treaty. The understanding that there can be no sliding scale of legal commitment must apply to the non-treaty field too: either an agreement is binding under international law or it is not.”<sup>142</sup>

Alongside the recognition of a sliding scale from hard to soft law, there is also the argument that some hard law is ‘soft’ in nature.

### 3.4.1.2 Hard Law that is ‘Soft’ in Nature

A similarly contested soft law concept as that of a sliding scale between hard and soft law is that of hard law instruments that are considered to be ‘soft’ in nature. Despite the binding nature of hard law instruments, interpretations of soft law have often expanded to include more general or vague provisions included in hard law instruments. Thus, while these instruments are legally binding, they may be seen to be ‘soft’ in nature.

Such an interpretation is recognised by many, such as Chinkin, who notes that

“if a treaty is to be regarded as "hard", it must be precisely worded and specify the exact obligations undertaken or the rights granted. Where a treaty provides only for the gradual acquiring of standards or for general goals and programmed action it is itself soft”.<sup>143</sup>

Similarly, Baxter recognises “legally fragile”<sup>144</sup> hard law instruments. This description refers to the fact that these ‘hard law’ treaties, could be considered as ‘soft’ in the sense that they could not be recognised as creating obligations which could possibly be violated (i.e., they could not be interpreted as being violated in any particular way). Following on from this description, Baxter considers that these instrument are fragile, even though they are binding legal instruments, because they create ““obligations” of such a fragility that

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<sup>142</sup> Hartmut Hillgenberg, ‘A Fresh Look at Soft Law’ (1999) 10 *European Journal of International Law* 499, 507.

<sup>143</sup> Chritine M. Chinkin, ‘The Challenge of Soft Law: Development and Change in International Law’ (1989) 38(4) *The International and Comparative Law Quarterly* 850, 851.

<sup>144</sup> Emily Crawford, *Non-Binding Norms in International Humanitarian Law: Efficacy, Legitimacy, and Legality* (Oxford University Press 2021) 10.

legal enforcement may be difficult or even impossible”.<sup>145</sup> As an example, Baxter references the 1963 Nuclear Test Ban Treaty,<sup>146</sup> which permitted States parties to the Treaty to withdraw, resulting in the interpretation that it “may not be enforceable in the strict legal sense.”<sup>147</sup> In a similar vein, “[c]onnected to this definition of soft law would be those rules contained in binding instruments that either lack sufficient precision as to the content of the obligation, or else establish an obligation that is essentially unenforceable (due to imprecision in scope and/or content) and/or is otherwise, at best, recommendatory in nature.”<sup>148</sup>

However, Prosper Weil highlights that in the latter instance, the ‘soft’ nature of a provision of a binding instrument does not alter the binding nature of this provision upon States party to this instrument:

“[w]hether a rule is “hard” or “soft” does not, of course, affect its normative character. A rule of treaty or customary law may be vague, “soft”; but...it does not thereby cease to be a legal norm. In contrast, however definite the substance of a non-normative provision...that will not turn it into a legal norm.”<sup>149</sup>

Similarly, Lauterpacht emphasises that “they are ‘provisions...void and inapplicable on account of uncertainty and unresolved discrepancy’. Precision or lack thereof is not, however, an appropriate criterion for determining whether an agreement is binding or not.”<sup>150</sup> Thus, a binding, hard law instrument was drafted and agreed to by States as such – to create binding obligations, regardless of how ‘soft’ in nature these obligations may be. In tandem, soft law is non-binding in nature and no amount of precision in the provisions of a soft law instrument will make this provision binding in nature. As Chapter

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<sup>145</sup> Ibid 11.

<sup>146</sup> Treaty Banning Nuclear Weapon Tests in the Atmosphere in Outer Space and Under Water (concluded 5 September 1963, entered into force 10 October 1963) UNTS vol. 480 (1963 Limited Test Ban Treaty).

<sup>147</sup> Emily Crawford, *Non-Binding Norms in International Humanitarian Law: Efficacy, Legitimacy, and Legality* (Oxford University Press 2021) 11.

<sup>148</sup> Ibid 12.

<sup>149</sup> Prosper Weil, ‘Towards Relative Normativity in International Law?’ (1983) 77(3) *The American Journal of International Law* 413, 414.

<sup>150</sup> Hartmut Hillgenberg, ‘A Fresh Look at Soft Law’ (1999) 10 *European Journal of International Law* 499, 500.

4 discusses, soft law is increasingly being adopted in IHL and some of these instruments deal with the intersection of IHL and Outer Space. An understanding of soft law and its role in IHL provides a foundation for the recommendations for the regulation of the use of weapons in Outer Space that this research forms.

### **3.4.1.3 How this Research Defines ‘Soft Law’**

Following on from the conclusions of Weil and Lauterpacht outlined above, this thesis differentiates between hard and soft law on the basis of their legally binding nature. Establishing the definition that this research adopts for ‘soft law’ instruments informs the recommendations that Chapter 7 outlines with regards to the form that an instrument regulating the use of weapons in Outer Space from the perspective of the principle of humanity in IHL should take. While a binding legal instrument may contain provisions that are ‘soft’ by virtue of their being vague or not creating specific obligations, this does not alter the fact that a treaty is a binding legal source. Furthermore, this research contends that no level of detail or specificity in the provisions of a soft law instrument, such as a manual or a set of guidelines, changes the fact that these provisions do not create legally binding obligations upon parties to the instrument. Thus, while it is recognised in this section that there are a range of variations of soft law, the term ‘soft law’ in this thesis will refer to those guidelines, manuals, and other legal instruments that, while States may agree to the content, they are not legally binding upon States in the sense that no State responsibility is incurred through breach of this content.

In terms of examples of soft law, this research considers UN General Assembly (UN GA) resolutions as soft law,<sup>151</sup> which Boyle notes are a favourable soft law option utilised in

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<sup>151</sup> While United Nations General Assembly (UNGA) Resolutions are not legally binding, it is noted with regards to the adopting of such resolutions by consensus adds significantly to their legal impact. See Medecins Sans Frontiers, ‘The Practical Guide to Humanitarian Law’ < <https://guide-humanitarian->

the United Nations,<sup>152</sup> as well as States use of “principles or political declarations in the hope of universalizing them by gathering a wider number of supporting States in the future”,<sup>153</sup> and expert manuals, that are discussed in Chapter 4 as these soft law instruments have become central in addressing modern IHL issues, including Outer Space.

### **3.4.2 Role of Soft Law in IHL**

While the shift towards collective efforts that focus on soft law has resulted in less binding law creation in recent times, there are varying opinions on both its role in IHL and whether it has a positive or negative impact on the field.

#### **3.4.2.1 Preference of Soft Law to Hard Law IHL Instruments**

With the definition of soft law that is being adopted for the purpose of this research outlined, it is important to analyse the reason for adopting soft law in preference of hard law and in doing so, establish the role that soft law plays in the IHL framework.

Abbott and Snidal in their work investigate the differing “tradeoffs”<sup>154</sup> that are entailed in the decisions between hard law and soft law implementation. For instance, hard law requires States to relinquish a certain amount of their sovereignty in return for binding legal obligations and repercussions for breach of these obligations being imposed on all

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law.org/content/article/3/soft-law/> accessed 15 May 2023: “[a] General Assembly resolution, adopted by a large majority, using precise language, and reflecting the opinion of the international community, may be considered as being of a legally binding nature, although it may not be enforceable.”

<sup>152</sup> Alan Boyle, ‘Soft Law in International Law-Making’ in Malcolm D. Evans (ed), *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 120.

<sup>153</sup> Cordula Droege and Eirini Giorgou, ‘How international humanitarian law develops’ (2022) 104(920-921) *International Review of the Red Cross* 1798, 1822.

<sup>154</sup> Kenneth W Abbott and Duncan Snidal, ‘Hard and Soft Law in International Governance’ (2000) 54(3) *International Organization* 421, 455.

other parties, as well as themselves. However, the alternative of soft law could be said to “balance competing considerations, offering techniques for compromise among states, among private actors, and between states and private actors...[it] helps actors handle the exigencies of uncertainty and accommodate power differentials.”<sup>155</sup>

One reason for the adoption of soft law instruments is that with regards to an issue that is constantly in a state of change or advancement, a hard law instrument will become outdated quickly. Hard law instruments take longer to draft and bring into force than soft law instruments, and thus, would be less favourable “when dealing with new and emergent technological and economic innovations that require a rapid response and may not be amendable to the kinds of legislative delays inherent in international...law making.”<sup>156</sup> As noted by D'Aspremont, soft law instruments are presumed a better option in such instances to “accommodate the growing complexity of contemporary international relations, and that complementary normative instruments are needed to regulate the multi-dimensional problems of the modern world.”<sup>157</sup> Particularly in the area of weapons regulation, which is the focus of this research, the development of new weapons technologies is constant and ever-changing. This is likely why the majority of the expert soft law manuals that Chapter 4 discusses deal with new and emerging means and methods of warfare.

Following on from D'Aspremont's statement, it is evident that soft law is also often preferred when not only the subject to be regulated is in flux, but also when there is uncertainty with regards to the geo-political climate. If, as Sassòli notes, “States are unable to find a consensus on many issues on which the international community has

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<sup>155</sup> Ibid.

<sup>156</sup> Emily Crawford, *Non-Binding Norms in International Humanitarian Law: Efficacy, Legitimacy, and Legality* (Oxford University Press 2021) 26.

<sup>157</sup> Jean D'Aspremont, ‘Softness in International Law: A Self-Serving Quest for New Legal Materials’ (2008) 19(5) *The European Journal of International Law* 1075, 1076.

pressing normative needs”,<sup>158</sup> the likelihood of reaching consensus on a binding legal instrument is low. However, States are more likely to agree to and engage with the creation of a soft law instrument despite existing geo-political tensions because they will not be bound to obligations in the sense that they will face repercussions upon breach.

Furthermore, as noted by Boyle, the creation of a soft law instrument, while not creating the binding legal obligations that a hard law instrument would, does focus the international community on issues at hand, in spite of any existing geo-political tensions as mentioned above. Thus, non-binding, soft law instruments are effective at “focusing consensus on rules and principles, and...mobilizing a consistent, general response on the part of States”.<sup>159</sup> This, once again, makes soft law instruments useful in responding to areas that need attention in a short space of time and in a collective manner. Furthermore, as is discussed in Section 3.3, the role that soft law instruments can play in creating a consensus on State opinion and principles that States agree with or adopt can constitute evidence of *opinio juris*<sup>160</sup> in the process of establishing custom in the future.

In many of the instances mentioned above, such as the creation of a non-binding instrument, the conclusion of State consensus and the reaction to the advancement of issues (which continue to advance); the introduction of soft law can constitute the initial step in the process towards the creation of a binding hard law instrument. The establishment of a soft law instrument can serve “to codify or assist in the development and application of general international law, or because they are the first step in a

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<sup>158</sup> Marco Sassòli, ‘How will international humanitarian law develop in the future?’ (2022) 104(920-921) *International Review of the Red Cross* 2052, 2053.

<sup>159</sup> Alan Boyle, ‘Soft Law in International Law-Making’ in Malcolm D. Evans (ed), *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 124.

<sup>160</sup> Emily Crawford, *Non-Binding Norms in International Humanitarian Law: Efficacy, Legitimacy, and Legality* (Oxford University Press 2021) 23-24 it is noted that soft law instruments can “contribute to the creation of customary international law by shaping State behaviour and *opinio juris*”. See also Hartmut Hillgenberg, ‘A Fresh Look at Soft Law’ (1999) 10 *European Journal of International Law* 499, 514 it is noted that “[i]ndisputably, a non-treaty agreement cannot directly produce customary international law, but it can contribute to its creation as an emerging *opinio juris*.”

negotiating process eventually leading to the conclusion of a multilateral treaty.”<sup>161</sup> Therefore, a soft law instrument can eventually contribute to the creation of treaty law, but often the soft instruments also maintain a purpose of their own. There are soft law instruments formed to outline and clarify the *lex lata* on a specific matter; for example, in the case of the expert manuals that are discussed in Chapter 4, they are soft law instruments that outline the current state of being with regards to a specific area of IHL.

With regards to the uptake in soft law instruments in IHL, Williamson in 2003 noted that the area of arms control was dealt with primarily through hard law instruments,<sup>162</sup> and that this trend itself would indicate that “there are advantages to hard law.”<sup>163</sup> One such advantage would be the increased likelihood of compliance with a hard law instrument, due to its binding nature. However, Williamson at this stage also highlighted both the decrease in the creation of hard law weapons regulation and the uptake of soft law instruments in the area of arms control during that time period.<sup>164</sup> The preference of soft law over hard law is seen with regards to Outer Space with the current expert manual projects that address the intersection of IHL and ISL that Chapter 4 discusses. The role of these manuals help to inform the recommendations that this research forms for the regulation of the use of weapons in Outer Space. As noted, an important role of soft law in IHL is that it can contribute to the formation of customary IHL, as outlined in the following sub-section.

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<sup>161</sup> Alan Boyle, ‘Soft Law in International Law-Making’ in Malcolm D. Evans (ed), *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 120.

<sup>162</sup> Richard L Williamson Jr, ‘Hard Law, Soft Law, and Non-Law in Multilateral Arms Control: Some Compliance Hypotheses’ (2003) 4(1) *Chicago Journal of International Law* 59, 67.

<sup>163</sup> *Ibid* 68.

<sup>164</sup> *Ibid* 69 it is noted that “we are unlikely to be able to prove any propositions as to the relative likelihood that nations will comply with nonbinding norms or with binding legal obligations in the arms control field.”

### **3.4.2.2 Contribution of Soft Law to the formation of Customary IHL**

While non-binding in nature, soft law has become a prevalent part of the IHL framework including contributing to the formation of hard law. As noted in Section 3.3, custom has a central role in IHL. The elements required for the formation of customary international law can be fulfilled by the adoption of soft law.

Primarily, soft law instruments “have the capacity to contribute to, influence, and guide State and non State behaviour, especially in fields where achieving consensus on binding rules has been notably difficult”.<sup>165</sup> If States follow the practice of a soft law instrument in a widespread and consistent manner, this could constitute the requirement of State practice for the formation of customary IHL. It is noted with respect to soft-law expert manuals, as Chapter 4 discusses, that the process of formation of these instruments allows those involved to “sift that evidence [referring to evidence of state practice] and identify the norms that can be inscribed with the marks of custom.”<sup>166</sup>

### **3.4.2.3 Arguments Against Soft Law**

While the ever-increasing number of soft law instruments and contributions to IHL evidence the fact that there are proponents of soft law and, as previously noted by Guzman and Meyer, that soft law is clearly implemented in State practice; there remain those that are opposed to soft law and who deem its contribution as “detrimental”<sup>167</sup> to the international legal framework.

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<sup>165</sup> Emily Crawford, *Non-Binding Norms in International Humanitarian Law: Efficacy, Legitimacy, and Legality* (Oxford University Press 2021) 42.

<sup>166</sup> Yoram Dinstein, ‘Law of Armed Conflict Manuals’ in Terry D. Gill et al (eds) *Yearbook of International Humanitarian Law 2020* (Vol 23, Asser Press 2022) 5.

<sup>167</sup> Jan Klabbbers, ‘The Undesirability of Soft Law’ (1998) 67(4) *Nordic Journal of International Law* 381, 382-383.

Scholars such as Klabbers, for example, do not value soft law and as noted by Boyle, such scholars consider soft law as “redundant”.<sup>168</sup> Klabbers, alongside Weil<sup>169</sup> and d’Aspremont,<sup>170</sup> does not support the notion of ‘soft’ law being considered as law – they argue that “[i]f it is not binding, it cannot be law, soft or otherwise.”<sup>171</sup> Weil recognises that ‘soft law’ has a role, wherein it “may well constitute an important stage in the process of elaborating international norms...[but] they do not constitute the formal source of new norms.”<sup>172</sup> However, Klabbers does not see soft law as having value for the legal system.<sup>173</sup> One example would be expert manuals which aim to provide additional specification and clarification on legal norms and obligations created in existing hard law instruments. However, Klabbers argues that “having recourse to additional guidelines to try and understand the scope of language used in treaties seems counterproductive, for: if language is itself indeterminate, it is difficult to see why the language of soft law instruments would be an exception.”<sup>174</sup> Thus, Klabbers does not view soft-law expert manuals as adding more than that which is already enshrined in pre-existing binding law. D’Aspremont highlights that “[i]t seems to be commonly agreed today that a legal act ought not to be normative to be legal”,<sup>175</sup> but Sir Hersch Lauterpacht was of the contrary opinion. This is evident from his opinion in the *Norwegian Loans Case [1957]* before the ICJ,<sup>176</sup> wherein it was expressed that “[a]n instrument in which a party is entitled to

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<sup>168</sup> Alan Boyle, ‘Soft Law in International Law-Making’ in Malcolm D. Evans (ed) *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 119-120.

<sup>169</sup> Prosper Weil, ‘Towards Relative Normativity in International Law?’ (1983) 77 *American Journal of International Law* 413.

<sup>170</sup> Jean d’Aspremont, *Formalism and the Sources of International Law: A Theory of the Ascertainment of Legal Rules* (Oxford University Press 2011).

<sup>171</sup> Emily Crawford, *Non-Binding Norms in International Humanitarian Law: Efficacy, Legitimacy, and Legality* (Oxford University Press 2021) 17-18.

<sup>172</sup> *Ibid* 24.

<sup>173</sup> *Ibid* 19. See also Jan Klabbers, ‘The Undesirability of Soft Law’ (1998) 67(4) *Nordic Journal of International Law* 381, 382-383.

<sup>174</sup> *Ibid*.

<sup>175</sup> Jean D’Aspremont, ‘Softness in International Law: A Self-Serving Quest for New Legal Materials’ (2008) 19(5) *The European Journal of International Law* 1075, 1085.

<sup>176</sup> *Norwegian Loans case (France v Norway)* (Judgment) [1957] ICJ Rep. at 48, Separate Opinion of Judge Lauterpacht to the Decision of 6 July 1957.

determine the existence of its obligation is not a valid and enforceable legal instrument of which a court of law can take cognizance. It is not a legal instrument. It is a declaration of a political principle and purpose.”<sup>177</sup> Furthermore, two years later in a dissenting opinion in the case of *Interhandel (Switzerland v United States of America) Case [1959]*,<sup>178</sup> Sir Lauterpacht re-states his opinion from the *Norwegian Loans Case [1957]*<sup>179</sup> and his belief that, in this instance with regards to a Declaration of Acceptance and an automatic reservation enshrined therein, that the ICJ is “the guardian of its Statute”<sup>180</sup> and by virtue of its Statute cannot act upon a reservation, which is for this reason rendered “without force and legal effect.”<sup>181</sup> Thus, this reasoning is based on the requirement of binding legal force to be present in order for an instrument to constitute ‘law’. This opinion would not consider soft law to be law at all due to its lack of binding legal force.

While the use of soft law is not supported by all international legal scholars, it does have an increased role in IHL, specifically weapons regulation. This is important for the recommendations that this research will form with respect to how to move forward with the regulation of weapons use in Outer Space and whether binding or soft law is recommended.

### **3.5 Conclusion**

In this chapter, Section 3.1 introduces the IHL framework and its central aims and principles. The following sections of the chapter address the different sources of IHL, focusing on case law, customary IHL and soft law respectively. Through doing so, this

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<sup>177</sup> Ibid.

<sup>178</sup> *Interhandel (Switzerland v United States of America) Case (Judgment) [1959] ICJ Rep. 6, at 116.*

<sup>179</sup> *Norwegian Loans case (France v Norway) (Judgment) [1957] ICJ Rep. at 48, Separate Opinion of Judge Lauterpacht to the Decision of 6 July 1957.*

<sup>180</sup> *Interhandel (Switzerland v United States of America) Case (Judgment) [1959] ICJ Rep. 6, at 104, Sir Hersch Lauterpacht’s Dissenting Opinion.*

<sup>181</sup> Ibid.

chapter contributes to research sub-questions one and two by examining the IHL framework, one of the frameworks within which there exists a gap regarding the use of weapons in Outer Space. Furthermore, it is also this framework that helps to inform the recommendations which this research forms for weapons regulation from the perspective of the principle of humanity in IHL.

In investigating IHL, it is evident that the development of regulation of conflict has created a significant body of legal sources, including case law, customary IHL and soft-law instruments, as well as the binding weapons regulation instruments which are discussed in Chapter 4. The foundation of the provisions or rules in these source of IHL can be linked back to the principle of humanity as this research defines it with regards to their role in reducing unnecessary suffering and superfluous injury in times of armed conflict.

Furthermore, customary IHL also plays a significant role, particularly in ensuring the universal applicability of the rules of IHL that gain customary status. Soft law instruments can also contribute towards the eventual formation of custom, as well as having an independent role of gaining consensus and providing clarity, particularly in the case of expert IHL manuals, some of which focus on weapons regulation and the militarisation of Outer Space, as Chapter 4 illustrates. The increase in the significance of soft-law is taken in consideration in the recommendations for the regulation of the use of weapons in Outer Space formed by this research and the format for regulation that this research recommends. Having established the role of IHL, and its sources, in regulating conflict, Chapter 4 examines weapons regulation and the IHL instruments that place limitations on and regulate the use of means and methods of warfare during armed conflicts, both binding instruments and soft-law expert manuals. Chapter 4 builds upon the analysis of IHL in Chapter 3 by focusing on the regulation of weapons as provided for in the IHL framework. The analyses of both chapters contribute towards the understanding of the

weapons regulation framework, which applies to the regulation of the use of weapons in Outer Space, as well as the gaps that exist in this framework. These analyses thus contribute towards the answering of research sub-questions one and two.

## **Chapter 4: Regulation of Weapons**

### **4.0 Introduction**

While attempts have been made to prevent the use of certain weapons categories in Outer Space, there remains a lacuna in both the IHL weapons regulation framework and the ISL framework, discussed in Chapter 5, with regards to prohibition or regulation of weapons use in Outer Space being expressly included in a regulatory instrument. It is this gap that is highlighted in research sub-question two of this thesis. In order to address this gap, this research aims to form recommendations for express regulation of weapons use in Outer Space in a binding legal instrument.

The principle of humanity, as is outlined in Chapter 2, is central to weapons regulation in IHL and underpins the majority of weapons regulation and prohibition instruments formed to date, many of which are outlined in this chapter. This is because the principle, as it is defined for the purpose of this research in Chapter 2, seeks to limit the means and methods of warfare that States can utilise in armed conflict and reduce any unnecessary suffering or superfluous injury caused by these means or methods. It thus serves as a logical perspective from which to form recommendations for the regulation of the use of weapons in Outer Space, as are outlined Chapter 7, and can also be seen to do so in the instruments discussed in this chapter.

At the outset of this chapter, Section 4.1 introduces theories of regulation and Section 4.2 examines theories of weapons regulation specifically. The analysis of the theories behind the regulation of weapons informs the approaches taken to the existing weapons regulation instruments that are discussed in this chapter, as well as informing the recommendations formed by this research. Section 4.3 addresses the continued need for specific weapons regulation, particularly in light of the principle that underpin IHL that

are discussed in Chapter 3. Section 4.4 discusses the different forms that weapons regulation provisions take, such as prohibition, limitation and non-proliferation, as well as addressing the theory that deterrence serves as effective weapons regulation. Section 4.5 investigates weapons regulation instruments in the IHL framework and in doing so, identifies the approaches taken to regulation in existing IHL instruments. This investigation serves not only to outline the weapons regulation framework in which a gap exists with regards to weapons use in Outer Space, as highlighted in research sub-question two, but also informs recommendations for future weapons regulation. Section 4.6 addresses the soft law instruments of expert manuals that are increasingly being adopted in IHL, including two projects focusing on summarising the law relevant to military operations in Outer Space. Finally, Section 4.5 outlines why, based on the analysis of the chapter, we regulate certain weapons in certain ways. The analysis of the chapter contributes, alongside Chapter 3, to the understanding of the IHL framework that, along with the ISL framework discussed in the following chapter, regulates the use of weapons in Outer Space. Thus, it serves to answer research sub-question one of this thesis. The analysis of theories and approaches to weapons regulation, as well as how weapons have been regulated in the past, also informs the recommendations that this research makes with regards to the regulation of the use of weapons in Outer Space.

#### **4.1 Theories of Regulation**

Before outlining some of the theories underpinning weapons regulation and the reasoning behind restricting the use of certain weapons, it is important to look at some general theories of regulation, to provide an overview of why we regulate and what role laws plays in regulation. Morgan, Yeung and Twining define a theory of regulation as “a set of propositions or hypotheses about why regulation emerges, which actors contribute to

that emergence and typical patterns of interaction between regulatory actors.”<sup>1</sup> Baldwin, Cave and Lodge highlight, that at a governmental level, a motive for regulation may not align with technical justification.<sup>2</sup> Many of the theories of regulation discussed in literature are underpinned by economic or political considerations,<sup>3</sup> but they can nevertheless give insight into the role of law more generally in regulation because “[w]here regulation is understood essentially as state intervention into the economy by making and applying legal rules, theories of regulation can be seen as an explanation of how and why legislative standards come about”.<sup>4</sup>

With regards to the different theories of regulation that exist, Morgan, Yeung and Twining recognise three: “public interest theories, private interest theories and institutionalist theories.”<sup>5</sup> However, the list of theories of regulation is not exhaustive. For example, Hantke-Domas, with reference to economic literature, recognises the public interest theory of regulation, but the other category recognised is what is referred to as the “Chicago theory”.<sup>6</sup> There may be overlap between the definitions of the varying theories, as the ‘Chicago theory’ purports that “regulation does not protect the public at large but only the interests of groups”,<sup>7</sup> which could be deemed to align to a certain extent with the private interest theory, described by Morgan, Yeung and Twining as a belief that

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<sup>1</sup> Bronwen Morgan, Karen Yeung and William Twining, *An Introduction to Law and Regulation: Text and Materials* (Cambridge University Press 2007) 16.

<sup>2</sup> Robert Baldwin, Martin Cave & Martin Lodge, *Understanding Regulation: Theory, Strategy, and Practice* (Oxford University Press 2012) 15.

<sup>3</sup> Bronwen Morgan, Karen Yeung and William Twining, *An Introduction to Law and Regulation: Text and Materials* (Cambridge University Press 2007) 16 with regards to investigating why regulate, it is noted that “[i]n answering the ‘why’ question, we range beyond law to other disciplines, and much of the material in this chapter draws upon the disciplines of politics, economics and sociology.” See also Michael Hantke-Domas, ‘The Public-Interest Theory of Regulation: Non-Existence or Misinterpretation?’ (2003) 15 *European Journal of Law and Economics* 165, wherein it is noted that “[m]icroeconomic literature teaches of the existence of two contending theories of regulation. One the Public Interest Theory...the other, the Chicago theory”.

<sup>4</sup> Bronwen Morgan, Karen Yeung and William Twining, *An Introduction to Law and Regulation: Text and Materials* (Cambridge University Press 2007) 16.

<sup>5</sup> *Ibid.*

<sup>6</sup> Michael Hantke-Domas, ‘The Public-Interest Theory of Regulation: Non-Existence or Misinterpretation?’ (2003) 15 *European Journal of Law and Economics* 165.

<sup>7</sup> *Ibid.*

“regulation often benefits particular groups in society”,<sup>8</sup> and which shares this doubt of regulation purely in favour of the public’s interest. This example, albeit simplified, illustrates that there is not a strict set of theories of regulation and as noted, more theories are contributed from economic and political spheres of analysis.

Nevertheless, the public interest theory of regulation, which “attribute[s] to legislators (and others responsible for the design and implementation of regulation) a desire to pursue collective goals with the aim of promoting the general welfare of the community”<sup>9</sup> appears as one of traditional theories of regulation, based on the intervention (by way of introducing regulation) to prevent the damage that “market failure”<sup>10</sup> would have on the general public. However, Prosser argues that “the most commonly-cited regulatory rationale, that of market failure, is inadequate either to explain or to justify normatively the range of regulatory tasks currently undertaken.”<sup>11</sup> Elaborating on this contended inadequacy, as Baldwin, Cave and Lodge outline, Prosser highlights “that environmental and many other regulators can properly be seen as seeking to further social objectives, rather than as simply acting to correct market failures”<sup>12</sup> and thus, can serve the public interest in more ways than was originally envisaged in traditional public interest theory conceptions. It is thus evident that the public interest theory of regulation has many understandings, but all these interpretations of the public interest theory share the common interpretation of “the facilitative role that law plays: functioning as an instrument for achieving the chosen public interest objectives.”<sup>13</sup>

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<sup>8</sup> Bronwen Morgan, Karen Yeung and William Twining, *An Introduction to Law and Regulation: Text and Materials* (Cambridge University Press 2007) 17.

<sup>9</sup> *Ibid.*

<sup>10</sup> Robert Baldwin, Martin Cave & Martin Lodge, *Understanding Regulation: Theory, Strategy, and Practice* (Oxford University Press 2012) 15.

<sup>11</sup> Tony Prosser, ‘Regulation and Social Solidarity’ (2006) 33(3) *Journal of Law and Society* 364.

<sup>12</sup> Robert Baldwin, Martin Cave & Martin Lodge, *Understanding Regulation: Theory, Strategy, and Practice* (Oxford University Press 2012) 22.

<sup>13</sup> Bronwen Morgan, Karen Yeung and William Twining, *An Introduction to Law and Regulation: Text and Materials* (Cambridge University Press 2007) 41.

The role of law as the facilitator of the achievement of the public interest aligns with the role that the regulation of weapons is envisaged to play in IHL. The regulation serves to prohibit or limit the use of certain weapons which could cause excessive injury and unnecessary suffering. In a wider context, such as that of Outer Space, the risk of unnecessary suffering is not just posed to combatants, but to humankind at large and thus, the intervention of regulation with respect to weapons use in Outer Space would be essential to protect the public interest. Thus, this traditional (though often contested) theory of regulation is seen to align with weapons regulation in IHL. Nevertheless, Baldwin, Cave and Lodge emphasise that “[i]t should be stressed, however, that in any one sector or industry the case for regulating may well be based not on a single but on a combination of rationales”<sup>14</sup> and there are theories specific to weapons regulation which also apply, some of which are discussed in the following section.

#### **4.2 Theories of Weapons Regulation**

As this research focuses on using the lens of the principle of humanity in IHL to form recommendations for the use of weapons in Outer Space, it is useful to investigate the reasoning behind the regulation of weapons. Theories of arms or weapons control have developed alongside the continued development and regulation of weapons. However, interestingly, what is referred to as the “foundational theoretical work”<sup>15</sup> on the topic of theories of weapons regulation, such as that of Schelling and Halperin,<sup>16</sup> was published in the 1960s, despite the long history of weapons regulation that occurred prior to this date. This increased focus on theorising weapons control during this period could be

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<sup>14</sup> Robert Baldwin, Martin Cave & Martin Lodge, *Understanding Regulation: Theory, Strategy, and Practice* (Oxford University Press 2012) 23.

<sup>15</sup> Laura Grego, ‘The Case for Space Arms Control’ in Melissa De Zwart and Stacey Henderson, *Commercial and Military Uses of Outer Space* (Springer 2021) 82.

<sup>16</sup> Thomas C. Schelling and Morton H. Halperin, *Strategy and Arms Control* (Twentieth Century Fund 1961).

accounted to the power struggle of the time between the nuclear power States of the United States and the then USSR. This shift was mirrored in the weapons regulation instruments of the time, discussed in Section 4.6, which began to implement non-proliferation alongside the regulation or prohibition of weapons use.

Crawford and Vu note that the standard model of weapons regulation is “rooted in the pioneering work of Thomas Schelling...and Hedley Bull.”<sup>17</sup> Larsen notes that Bull was one of the early theorists, who “defined arms control in the broadest sense to refer to all forms of military cooperation between potential enemies in the interest of ensuring international stability”.<sup>18</sup> This creation of weapons regulation in order to maintain international stability was also underpinned by certain objectives sought to be achieved. It is noted that “[a]rms control analysts of the early 1960s were in agreement that the objectives of weapons regulation were threefold. For Thomas Schelling and Morton Halperin, they were reducing the likelihood of war, reducing the political and economic costs of preparing for war, and minimizing the scope and violence of war if it occurred”,<sup>19</sup> with Bull having theorised the same.<sup>20</sup>

Thus, this model hinges on the objectives that can be achieved by introducing weapons regulation measures in law, “to make war, and especially nuclear war, less likely, and to make it less catastrophic in terms of deaths and destruction...to reduce the economic costs of military programs...combating ‘the militarization of society’.”<sup>21</sup> However, Bull notes that this model of arms control, while based on achieving the outlined objectives, also serves to consolidate the existing power balance, which at the time was that of the United

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<sup>17</sup> Timothy W. Crawford and Khang X. Vu, ‘Arms Control as Wedge Strategy: How Arms Limitation Deals Divide Alliances’ (2021) 46(2) *International Security* 91, 94-95.

<sup>18</sup> Jeffrey A. Larsen, *Arms Control: Cooperative Security in a Changing Environment* (Lynne Rienner Publishers 2002) 2.

<sup>19</sup> *Ibid.*

<sup>20</sup> Hedley Bull, ‘Arms Control and World Order’ (1976) 1(1) *International Security* 3, 4.

<sup>21</sup> *Ibid.*

States and the USSR as the central global military powers. It is highlighted that, in the arms control instruments of the 1960s-70s, “[t]here is a tendency to confuse the national security of the United States and the Soviet Union with international security, the security of international society as a whole; it is the latter objective, not the former, that should be the cardinal one in assessing arms control policies.”<sup>22</sup> Due to the military arsenals of the United States and Russia during the Cold War, particularly with respect to their possession of nuclear weapons, these States were the focus of arms control.

Abt’s research of the 1960s also outlines the historical objectives of arms control, including those in the previously mentioned model, alongside additional objectives that could be identified in arms control measures of specific times:

- “1. Pacification (1815-present).
2. Reduction of economic costs of military security (1850-present).
3. Stabilization of the balance of military power (1815-present).
4. Equalization of military power vs. stabilization of superiority of power (1930-55).
5. Reduced danger of accidental war (1950 -60).
6. Reduced danger of war by provision of increased warning time (1960-?)”<sup>23</sup>

While considerations such as those of the economic costs of military security policies or the international relations aspects of these theories of weapons regulation do not appear as considerations which align with IHL, it is important to note that “[m]ilitary strategies are continuations of more political concepts for achieving national policy objectives.”<sup>24</sup> The compliance with or agreement to weapons regulation as a military strategy could prove useful in terms of a defensive military strategy or a strategy that could improve a State’s military power and position. Thus, unfortunately not all State involvement with an agreement to weapons regulation measures stem from a humanitarian perspective of

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<sup>22</sup> Ibid 4 -5.

<sup>23</sup> Clark C. Abt, ‘Disarmament as a Strategy’ (1963) 7(3) *The Journal of Conflict Resolution* 293, 294.

<sup>24</sup> Ibid 296.

reducing unnecessary suffering and superfluous injury during an armed conflict but could rather be utilised by States to forward their own political agendas.

Despite this, the reduction of the unnecessary suffering in armed conflict is one objective which is visible in the principles of IHL and also re-iterated in the majority of weapons regulations instruments. For instance, Reddy, with particular reference to the prohibition of chemical and biological weapons, refers to the use of weapons regulation to instil more humanity the conduct of war, noting that “the law serves as the appropriate medium to restrict or proscribe certain categories of weapons... arguably in an attempt to make war "more humane".”<sup>25</sup> In the similar vein, he refers to humanity as being “cited as a source of international law”,<sup>26</sup> noting its incorporation in the St Petersburg Declaration,<sup>27</sup> the Hague Convention II,<sup>28</sup> and the 1925 Geneva Protocol;<sup>29</sup> concluding that “laws of humanity bear significance where existing principles of the law of war are being interpreted or new principles are recognized.”<sup>30</sup>

The objective of diminishing the unnecessary suffering in armed conflicts has been an objective of arms control theories since early models and this aim is also central in IHL and specifically weapons regulation in modern times. The principle of humanity, which is defined by this thesis as having the objective to reduce unnecessary suffering and superfluous injury, is central to weapons regulation both as a principle of IHL, but also through its inclusion in binding weapons regulation instruments.

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<sup>25</sup> Karunanidhi Reddy, 'The Regulation of Chemical and Biological Weapons in International Law: Preserving the Paradox of Humane War' (2008) 2008 Journal of South African Law 669.

<sup>26</sup> Ibid 671.

<sup>27</sup> 1868 St. Petersburg Declaration.

<sup>28</sup> The 1899 Hague Convention II.

<sup>29</sup> Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (entered into force 8<sup>th</sup> February 1928) (1925 Geneva Gas Protocol).

<sup>30</sup> Karunanidhi Reddy, 'The Regulation of Chemical and Biological Weapons in International Law: Preserving the Paradox of Humane War' (2008) 2008 Journal of South African Law 669, 671.

Based on the analysis of the previous two sections, it is arguable that elements of the public interest theory of regulation can be seen in the justification of weapons regulation in order to limit unnecessary suffering. The limitation of unnecessary suffering in armed conflict situations would be in the interests and benefit of the public (in the case of armed conflict situations, combatants and civilians). This research highlights that in the instance of an armed conflict and weapons use in Outer Space, the public whose interests need to be considered would be humankind as a whole. Furthermore, this objective for regulating weapons use and the aim of the principle of humanity to make armed conflict as humane as possible and reduce unnecessary suffering can be seen to align with one another.

The reduction of unnecessary suffering can be seen as a theory underpinning many of the weapons regulation instruments discussed in this chapter. For example, the prohibition of explosive projectiles in the 1868 St Petersburg Declaration<sup>31</sup> and of dum-dum bullets in the 1899 Hague Declaration (IV, 3)<sup>32</sup> could be seen to exemplify the objective of reducing unnecessary suffering caused by these types of weapons. The process of nuclear weapons regulation up to the modern-day, discussed in Section 4.6, contains instruments that are illustrative of different objectives pertaining to weapons regulation. While arguably all regulation of nuclear weapons would be in the interest of reducing unnecessary suffering, instruments such as the 1968 Non-Proliferation Treaty (NPT),<sup>33</sup> also displayed objectives of preventing a nuclear arms race and as Bull notes, consolidated the superior nuclear-power dynamics of the United States and the Soviet Union.<sup>34</sup>

Therefore, it is evident, that while the outcome of a weapons regulation instrument may be the reduction of unnecessary suffering, that may not have been the main intended

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<sup>31</sup> 1868 St. Petersburg Declaration.

<sup>32</sup> 1899 Hague Declaration IV, 3.

<sup>33</sup> Treaty on the Non-Proliferation of Nuclear Weapons (opened for signature 1968, entered into force 1970) UNTS 729, p.161 (1968 Non-Proliferation Treaty).

<sup>34</sup> Hedley Bull, 'Arms Control and World Order' (1976) 1(1) *International Security* 3, 4-5.

objective. Similar to the 1968 NPT<sup>35</sup> stopping an arms race but also consolidating existing power dynamics, the 1980 CCW<sup>36</sup> was argued by Solis to have given military preferences of powerful States involved in the drafting process “much greater priority than humanitarian concerns.”<sup>37</sup>

However, it is noted that while there may be varied objectives at play in States’ involvement in the drafting of a weapons regulation instrument, almost all forms of weapons regulation or prohibition result in the reduction of superfluous injury and unnecessary suffering to some extent, regardless of the respective reasons of States for their involvement in the process. For example, despite the military preferences of powerful States being put first with regards to the CCW, it remains a central instrument because these States choose “to address the humanitarian impact of their weapons through the CCW.”<sup>38</sup>

Thus, while not all weapons regulation instruments emerge from objectives based solely on the ideals of the principle of humanity and the want to reduce the unnecessary suffering and superfluous injury in armed conflict in the interests of humanity and the public as a whole, that outcome is nevertheless achieved. The instruments discussed in this chapter refer back to the principle of humanity and are underpinned by the objectives seen in the public interest theory of regulation and in the model of arms control theorists<sup>39</sup> to minimise the extent of suffering in a time of armed conflict. Thus, it is this common link of the principle of humanity to weapons regulation, historically and in instruments in the current-day IHL framework, that justifies the use of the perspective of this principle in

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<sup>35</sup> 1968 Non-Proliferation Treaty.

<sup>36</sup> 1980 Convention on Certain Conventional Weapons.

<sup>37</sup> Gary D. Solis, *The Law of Armed Conflict: International Humanitarian Law in War* (Cambridge University Press 2010) 579.

<sup>38</sup> *Ibid* 592.

<sup>39</sup> See Thomas C. Schelling and Morton H. Halperin, *Strategy and Arms Control* (Twentieth Century Fund 1961). See also Hedley Bull, ‘Arms Control and World Order’ (1976) 1(1) *International Security* 3.

this research as the lens through which to form recommendations for an instrument regulating the use of weapons in Outer Space. To build upon the theories or reasoning behind weapons regulation that this section discusses, the following section discusses the continued need for weapons regulation. As noted, this research adopts the principle of humanity as its lens, but with the existence of this and the other principles of IHL, it is important to highlight that the need for express weapons regulation instruments has not diminished.

### **4.3 The Need for Weapons Regulation**

The underpinning principles of IHL, such as the principle of humanity, establish that choices in armed conflict situations should be made with the view of reducing unnecessary suffering and superfluous injury. Thus, the purpose of or need for additional weapons regulation instruments may be questioned. Persisting issues have required the development of more IHL. For example, the ‘basic rule’ in Art 35 of Additional Protocol I<sup>40</sup> which outlines that the choice of means and methods of warfare are not unlimited expressly prohibited the ‘total war’ theories. Another issue that continues to cause challenges for modern IHL and is the case with respect to this research is the continued advancements in the development of weapons technologies which necessitates more weapons regulation instruments. These issues are discussed in the following sub-sections.

#### **4.3.1 Persistence of ‘Total War’ Approach to Armed Conflict**

Despite the history of civilisations and religions placing limitations on the unnecessary suffering, as Chapter 2 outlines, some theorists and writers of war strategy were

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<sup>40</sup> 1977 Additional Protocol I, art 35.

proponents of the concept of ‘total war’ in centuries that followed. For example, Carl Von Clausewitz’s analysis of war contains the idea of absolute war, wherein, as noted by Gibbs, it is considered that “war-as a concept -is identified with violence and violence naturally tends to extremes”.<sup>41</sup> Such concepts of Von Clausewitz’s were utilised by Nazi Germany, wherein Von Clausewitz’s “dictum that political ends should drive military strategy on its head as the army came to dictate that ‘military necessity’ should drive policy and strategy”.<sup>42</sup> Thus, the justification of military necessity was used in all decisions made in armed conflict situations, which would result in the breaching of limitations and the causing of unnecessary suffering

While concepts such as total or absolute war that are contrary to the objectives of weapons regulation are now considered outdated, it is nevertheless important to investigate these concept and maxims and how they were previously used to justify breaching the limitations on war-time behaviour. Another such example is the maxim known as *Kriegraison*, of which the principle of humanity “is an explicit rejection”.<sup>43</sup>

The 1987 Commentary on Art 35 of the 1977 Additional Protocol I to the Geneva Conventions<sup>44</sup> notes that “[a] number of different theories, of which some are still in existence, seek to contest the validity of the rule”,<sup>45</sup> with regards to the rule that weapons choice in armed conflicts is not unlimited. The maxim contrary to this rule is described as follows:

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<sup>41</sup> Norman H Gibbs, ‘Clausewitz on the Moral Forces in War’ (1975) 27(4) *Naval War College Review* 15, 19.

<sup>42</sup> R. Gerald Hughes, ‘Carl Von Clausewitz and his Philosophy of War: The Evolution of a Reputation 1831-2021’ (2020) 105(386) *The Journal of the Historical Association* 773, 779.

<sup>43</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 48.

<sup>44</sup> 1977 Additional Protocol I.

<sup>45</sup> ICRC, ‘Commentary of 1987 on Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Article 35’ <<https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=2F157A9C651F8B1DC12563CD0043256C>> accessed 28 March 2022.

“[t]he best known of these, though it is now out of date, was expressed by the maxim "Kriegsraison geht vor Kriegsmanier" ("the necessities of war take precedence over the rules of war"), or "Not kennt kein Gebot" ("necessity knows no law"). These maxims imply that the commander on the battlefield can decide in every case whether the rules will be respected or ignored, depending on the demands of the military situation at the time.”<sup>46</sup>

This doctrine remained in existence in armed conflict reasoning during World War II and at the Nuremberg IMT where Downey notes that “it was used as a defense in many of the trials of German war criminals”,<sup>47</sup> but also where it eventually “was condemned”.<sup>48</sup> As a maxim, Kriegsraison no longer has any standing as it is completely at odds with IHL, with it being noted that “the doctrine of kriegsraison must be abandoned definitely and finally, or there is an end of international law, and in its place will be left a world without law”.<sup>49</sup> It is recognised in the instruments discussed in Sections 4.5 and 4.6, as well as in customary international law,<sup>50</sup> that there is not an unlimited choice for States of the weapons that they choose to employ in armed conflict. However, just as there existed attempts to limit arms choices to regulate armed conflict, Kriegsraison illustrates there were also doctrines and maxims interpreted in attempts to justify total war, with the latter being rejected and the former prevailing to form a considerable number of instruments.

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<sup>46</sup> ICRC, ‘Commentary of 1987 on Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Article 35’ <<https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=2F157A9C651F8B1DC12563CD0043256C>> accessed 28 March 2022.

<sup>47</sup> William Gerald Downey Jr., ‘The Law of War and Military Necessity’ (1953) 47(2) *The American Journal of International Law* 251, 253.

<sup>48</sup> ICRC, ‘Commentary of 1987 on Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Article 35’ <<https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=2F157A9C651F8B1DC12563CD0043256C>> accessed 28 March 2022.

<sup>49</sup> William Gerald Downey Jr., ‘The Law of War and Military Necessity’ (1953) 47(2) *The American Journal of International Law* 251, 253.

<sup>50</sup> ICRC International Humanitarian Law Database, ‘Rule 70: Weapons of a Nature to Cause Superfluous Injury or Unnecessary Suffering’ <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule70](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule70)> accessed 19 May 2022. See also *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996, ss238 wherein the reductions of superfluous injury and unnecessary suffering was described as one of the “cardinal principles” of IHL.

### 4.3.2 Development of New Weapons Technologies

It is noted that “[t]here is always...going to be a certain tension between the rules that are based on what is already understood and the process of expanding the boundaries of knowledge and, thereby, of activity.”<sup>51</sup> A failing of IHL is its inability to keep pace with science and the advancements that it makes, particularly with regards to the new means and methods of warfare that science makes available. The introduction of weapons regulation instruments tends to be retrospective to the fielding and witnessing of the consequences of a particular weapons technology – with a notable exception being the prohibition on blinding laser weapons in Protocol IV to the 1980 CCW on blinding laser weapons,<sup>52</sup> as is discussed in this chapter.

As highlighted in Chapter 6, the weapons that can be used in Space upon which this research focuses primarily are considered conventional weapons (such as those dealt with in the 1980 CCW)<sup>53</sup> and thus, they are advancements on conventional technologies as opposed to being excessively advanced themselves. Nevertheless, Boothby notes that “[t]he requirement is that the law of armed conflict should be relevant and applicable to all armed conflicts, whether the means and methods employed are technologically advanced or primitive.”<sup>54</sup> In order to achieve this relevance, it may be necessary to add updated instruments to the IHL framework because the continued development of new weapons technologies remains a challenge to weapons regulation in IHL, as new weapons are constantly a possibility.

As Section 4.6 discusses with regards to 1977 Additional Protocol I, Article 36 does introduce a requirement upon States when developing and introducing new weapons

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<sup>51</sup> William H. Boothby, ‘Regulating New Weapons Technologies’ in William H. Boothby (ed) *New Technologies and the Law in War and Peace* (Cambridge University Press 2019) 16.

<sup>52</sup> 1993 Protocol IV to the 1980 Convention on Certain Conventional Weapons.

<sup>53</sup> 1980 Convention on Certain Conventional Weapons.

<sup>54</sup> William H. Boothby, ‘The Legal Challenges of New Technologies: An Overview’ in Hitoshi Nasu and Robert McLaughlin (eds) *New Technologies and the Law of Armed Conflict* (Asser Press 2014) 25.

technologies to consider their compliance with IHL through a weapons review.<sup>55</sup> This illustrates that the development of new weapons technologies is a concern in IHL and constitutes an attempt to address and encourage responsible behaviours from States with respect to the weapons that they develop and use during the conduct of hostilities. This creation of an obligation on States to carry out a ‘weapons review’ as it is known can be seen to have good intentions but it is unclear as to whether it is effective in preventing the development of new weapons technologies with dangerous potentials. For example, one issue is that “[t]here is no prescribed form for a weapons review and there is no particular procedure that the weapon review process must adopt”,<sup>56</sup> which leaves a certain amount of leniency to States. It is within this leniency that States can develop and introduce new weapons technologies, such as those which can operate in Outer Space, the use of which this research forms recommendations to regulate. In addition, whether the placement of a prohibition on a weapons use arises from a weapons review under Article 36 of 1977 Additional Protocol I<sup>57</sup> or State consensus on a pre-existing technologically advanced weapon, Boothby does highlight that it is important to get “the timing and content of the legal arrangements right”<sup>58</sup> in order to effectively address emerging weapons technologies.

This research argues that prospect of the weaponisation of Outer Space has been present for as long as Outer Space has been militarised, a timeline which Chapter 6 outlines, as during the Cold War both Space Power States were developing and did successfully create and test new weapons technologies. While the current concerns with regards to weapons

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<sup>55</sup> 1977 Additional Protocol I, art 36; “[i]n the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party”.

<sup>56</sup> William H. Boothby, ‘Regulating New Weapons Technologies’ in William H Boothby (ed), *New Technologies and the Law in War and Peace* (Cambridge University Press 2019) 39.

<sup>57</sup> 1977 Additional Protocol I, art 36.

<sup>58</sup> William H. Boothby, ‘Regulating New Weapons Technologies’ in William H Boothby (ed), *New Technologies and the Law in War and Peace* (Cambridge University Press 2019) 42.

in Outer Space are more conventional in nature, this weapons use remains outside of the regulation provided for in the IHL & ISL frameworks and thus, its use remains unregulated. The gap in the current legal regime for weapons use in Outer Space could serve as inspiration for the development of future Space weapons. It is for this reason that this research seeks to form recommendations for the regulation of such weapons use in Outer Space. The following investigation of the forms that weapons regulation instruments take provides important context on the legal environment in which the recommendations that this research forms are placed.

#### **4.4 Forms of ‘Weapons Regulation’**

Watts emphasises that “even with the benefit of extensive records of State practice and relatively complete archives of diplomatic proceedings, no theory currently accounts for how weapons law develops under the law of war”<sup>59</sup> and often, as this section and Section 4.5 illustrate, how weapons regulation emerges is often determined less by legal processes and more by the political situations and interests of States. Nevertheless, this section aims to trace the approaches that have been adopted to weapons regulation that are evident in different instruments in the IHL framework. It is identified that the regulation of weapons use occurs under IHL in two ways – through the IHL general principles,<sup>60</sup> and through specific regulation<sup>61</sup> in the form of IHL weapons regulation instruments.

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<sup>59</sup> Sean Watts, ‘Regulation-Tolerant Weapons, Regulation-Resistant Weapons and the Law of War’ (2015) 91 *International Law Studies* 540, 542.

<sup>60</sup> *Ibid*: “[i]n general, the law of war regulates emerging technologies and existing weapons in two ways. Primarily, States have resorted to generally applicable principles and limitations to regulate weapon technology and use.”

<sup>61</sup> *Ibid*: “States have employed rules to either ban or limit the use, possession, production and transfer of very specific technologies of war. As with law of war principles, rules for specific weapons take the form of either treaty or custom. And like principles, specific regulations are found in military legal and tactical doctrine. However, rather than regulate generally, rules address themselves to specific weapons or, at most, families of weapons.”

#### 4.4.1 Regulation through IHL Principles

As this chapter recognises, [t]he principles of IHL are those of distinction, military necessity, and proportionality, all stemming from the central principle of humanity;<sup>62</sup> with the latter, foundational principle forming the lens of the analysis of this research.

The principle of humanity always applies to weapons use considerations in all armed conflict situations, regardless of whether it is expressly included in binding weapons regulation instruments or not.<sup>63</sup> Furthermore, Watts notes that “[a]ll weapons, regardless of their nature or novelty, are subject to each of the principles of the law of war. No further expression of consent by States is required to apply law of war principles to new weapons.”<sup>64</sup> Unlike with the creation of a treaty which States have a choice whether to sign and ratify, the core principles of IHL apply to all States universally without any choice to opt out of the obligations or responsibilities under the IHL principles. Thus, all States are bound not to use weapons that cause unnecessary suffering or superfluous injury. In this respect, the “law of war principles have proved enduring and flexible guides to the lawfulness of weapons”.<sup>65</sup>

However, while these principles provide a basic foundation of establishing the limits on weapons, there has been much uncertainty as to whether the application of the principle of humanity to a State’s choice of weapons to employ in an armed conflict situation can

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<sup>62</sup> Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 47: “the principle of humanity, which is also at the core of the laws of armed conflict”.

<sup>63</sup> Sean Watts, ‘Regulation-Tolerant Weapons, Regulation-Resistant Weapons and the Law of War’ (2015) 91 *International Law Studies* 540, 543. This is also inherent to the Martens Clause, as enshrined in the 1899 Hague Convention II, preamble: “[u]ntil a more complete code of the laws of war is issued, the High Contracting Parties think it right to declare that in cases not included in the Regulations adopted by them, populations and belligerents remain under the protection and empire of the principles of international law, as they result from usages established between civilized nations, from the laws of humanity, and the requirements of public conscience”.

<sup>64</sup> *Ibid.*

<sup>65</sup> *Ibid.* 542.

extend to an outright prohibition of an excessively injurious weapon in the absence of a binding instrument of prohibition.<sup>66</sup>

The stance of the ICJ on the matter appears to be that a legally binding instrument would be required to outright prohibit a weapon. In the judgment of the case of *Military and Paramilitary Activities in and Against Nicaragua (Nicaragua v. U.S.)*,<sup>67</sup> it was noted that “in international law there are no rules, other than such rules as may be accepted by the State concerned, by treaty or otherwise, whereby the level of armaments of a sovereign State can be limited”.<sup>68</sup> Furthermore in the advisory opinion of the ICJ on the *Legality of the Threat or Use of Nuclear Weapons*<sup>69</sup> it was noted that “State practice shows that the illegality of the use of certain weapons as such does not result from an absence of authorization, but, on the contrary, is formulated in terms of prohibition”.<sup>70</sup> Thus, it appears that express prohibition is required in order to prohibit the use of a weapon in an armed conflict situation.

Nevertheless, as noted by Doswald-Beck, in this same judgment, “the Court affirmed the importance of the Martens Clause”.<sup>71</sup> Furthermore, Judge Shahabuddeen detailed that the Martens Clause “provided the authority for treating the principles of humanity and the dictates of the public conscience as principles of international law to be ascertained in the

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<sup>66</sup> Theodor Meron, ‘The Martens Clause, Principles of Humanity, and Dictates of Public Conscience’ (2000) 94(1) *The American Journal of International Law* 78, 88. See also Lesley Wexler, ‘Limiting the Precautionary Principle: Weapons Regulation in the Face of Scientific Uncertainty’ (2006) 39(2) *U.C. Davis Law Review* 459, 482-483: “no domestic or international court has fleshed out the scope of these dictates as independent sources of law, and the Martens clause has never been successfully invoked to preclude the use of a new weapon.”

<sup>67</sup> *Case Concerning Military and Paramilitary Activities in and Against Nicaragua (Nicaragua v. United States of America)* (Merits) [1986] ICJ Reports 14.

<sup>68</sup> *Ibid* para. 269.

<sup>69</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996.

<sup>70</sup> *Ibid* para 52.

<sup>71</sup> Louise Doswald-Beck, ‘International Humanitarian Law and the Advisory Opinion of the International Court of Justice on the legality of the threat or use of nuclear weapons’ (1997) 321 *International Review of the Red Cross* 35, 48. See also the *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996, para 78, affirming the Martens Clause “whose continuing existence and applicability is not to be doubted”.

light of changing circumstances”<sup>72</sup> and further noted that the ‘elementary considerations of humanity’ were referenced in the *Corfu Channel Case* judgment.<sup>73</sup>

Thus, these opinions expressed by the ICJ demonstrate a lack of clarity on whether the principle of humanity, while it should be a consideration of States when choosing weapons to use during armed conflicts, can by itself serve to prohibit a weapon without an express, legally binding instrument. It is for this reason that this research aims to form recommendations for the regulation of the use of weapons in Outer Space in such a legally binding instrument. The principle of humanity serves as the logical lens through which to view prospective weapons regulation or prohibition due to its inclusion in the majority of weapons regulation instruments in IHL and its foundational nature for the body of law. The approaches to the regulation of weapons adopted by some of these instruments is discussed in the following sub-section.

#### **4.4.2 Regulation through specific IHL instruments**

While the principles of IHL guide the conduct of Parties to an armed conflict with respect to their weapons choice and use, express regulations and prohibitions on certain weapons are necessarily clarified and specified in these specific IHL instruments. These instruments also provide certainty to the regulation or prohibition of a specific weapon because, as Mickevičiūtė notes, “[o]pinions differ as to the direct effects of principles and if, independent of treaty law, they suffice to render a weapon illegal”,<sup>74</sup> as illustrated in the previous section.

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<sup>72</sup> Ibid.

<sup>73</sup> *Corfu Channel Case (United Kingdom v Albania)* (Mertis) [1949] ICJ Rep 4.

<sup>74</sup> Neringa Mickevičiūtė, ‘Lessons from the Past for Weapons of the Future’ (2016) 2 *International Comparative Justice* 99, 102.

With regards to the different aspects of weapons regulation it is recognised that “[t]here are basically two types of regulation: (a) the outlawing of specific weapons, weapons characteristics or weapons effects (a so-called *per se* prohibition applicable in all circumstances); and (b) the prohibition of certain uses of weapons that are otherwise lawful.”<sup>75</sup> Thus, for the purposes of this research, the outlawing or banning of specific weapons is referred to as ‘weapons prohibition’, while the prohibiting of specific uses of a weapon is referred to as weapons regulation/limitation because limits or regulations are being made as to specific uses of the weapon.

These are the two central approaches to weapons regulation, but a prohibition may also be combined in a strategy of disarmament or with a non-proliferation clause in a weapons regulation instrument. For this reason, these slightly different weapons regulation approaches will also be discussed alongside prohibition and regulation. Finally, the question of deterrence as a way to prevent weapons use is discussed because as was the case with nuclear deterrence, this proposal is often one that is suggested with regards to weapons use in Outer Space.

#### **4.4.2.1 Prohibition**

The placing of an express prohibition or ban on the use of a weapon in a formal IHL instrument was seen as early as the 1868 St Petersburg Declaration<sup>76</sup> which prohibited the use of explosive projectiles, albeit only in conflicts between the parties to the Declaration. The prohibition of a weapon usually results from its being inherently contrary to IHL and that its use in all circumstances does not comply with central requirements. For example, not being able to be used in a way which would distinguish

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<sup>75</sup> Jordan J. Paust, 'Controlling Prohibited Weapons and the Illegal Use of Permitted Weapons' (1983) 28(3) McGill Law Journal 608, 619.

<sup>76</sup> 1868 St Petersburg Declaration.

between civilians and combatants, or its use is excessively injurious and causes unnecessary suffering. It is important to highlight, as Dinstein does, “a weapon is not banned on the ground of ‘superfluous injury or unnecessary suffering’ merely because it causes ‘great’ or even ‘horrendous’ suffering or injury...that is not, in and of itself, enough to render these weapons illegal.”<sup>77</sup> Any weapon can be used in a way that causes unnecessary suffering. A weapon is prohibited because it cannot be used in a way in which it would not violate IHL.

Examples of weapons prohibitions have been seen with regards to biological<sup>78</sup> and chemical weapons<sup>79</sup> and cluster munitions.<sup>80</sup> Sassòli and Nagler recognise also the benefit of a specific ban as opposed to a broader prohibition that could apply to more weapons as “an explicit prohibition of certain weapons has its own advantages: it is easier to monitor the prohibition’s respect, and, if combined with a peacetime prohibition on their development, possession and transfer, it is less likely to be violated because those who fight cannot misuse weapons that are not available to them.”<sup>81</sup>

Pre-emptive prohibition has also occurred as seen in Protocol IV to the 1980 CCW,<sup>82</sup> which prohibited the use of blinding laser weapons before such weapons were even fielded. This is significant as international law in general, but particularly weapons regulation in IHL, is reactive as opposed to proactive in nature. This legal reality means that violations of IHL with respect to weapons use will have occurred and caused

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<sup>77</sup> Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict* (2<sup>nd</sup> edn, Cambridge University Press 2010) 59.

<sup>78</sup> 1972 Biological Weapons Convention.

<sup>79</sup> 1993 Chemical Weapons Convention.

<sup>80</sup> 2008 Convention on Cluster Munitions.

<sup>81</sup> Marco Sassòli and Patrick S Nagler, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar Publishing 2019) 387.

<sup>82</sup> 1995 Protocol IV to the 1980 Convention on Certain Conventional Weapons.

destruction and unnecessary suffering before it will be proposed to begin the process of trying to prohibit a weapon.

The approach of weapons prohibition, if agreed to by States, is effective in mitigating the risk of unnecessary suffering caused by specific weapons that are inherently contrary to IHL. However, a prohibition may not garner State support as they may no longer be able to use weapons that could be valuable to their military arsenal, which can result in a stalemate. Some of these situations have been witnessed with regards to weapons regulation attempts in the space law framework, as Chapter 6 illustrates.

The prohibition of weapons may be included in a policy of disarmament, with the terms being used interchangeably at times. While a prohibition bans the use of a weapon, this does eliminate the existence of this weapon from States' military arsenals. Thus, if a complete policy of disarmament is being implemented with regards to a weapon, a prohibition of use could be accompanied by a condition of non-proliferation. The following sub-section discusses both disarmament and non-proliferation with respect to weapons.

#### **4.4.2.2. Disarmament & Non-Proliferation**

Weapons prohibition may occur within wider plans and policies of 'disarmament' or 'arms control', which Bring describes as attempting to "remove certain weapons completely from the arsenals, or to reduce the quantity of specific weapons, or to stop or slow down new dangerous developments in the qualitative arms race."<sup>83</sup> Disarmament, in its aim to eliminate certain weapons and weapons technologies from States' military

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<sup>83</sup> Ove Bring, 'Regulating Conventional Weapons in the Future. Humanitarian Law or Arms Control' (1987) 24(3) *Journal of Peace Research* 275.

arsenals, involves banning “the use, possession, production and transfer of very specific technologies of war”,<sup>84</sup> as well as preventing stock-piling of these weapons.

The terms disarmament and arms control are often used together to refer to similar approaches that involve the prohibition of weapons. However, it appears that the two are not the same. Sir Clive Rose noted in 1982 that “[t]he terms 'disarmament' and 'arms control' are invariably twinned. They represent two completely different approaches to the question: What to do about armaments”,<sup>85</sup> wherein disarmament is founded on the belief “that the existence of armaments implies - or creates - the risk of their being used”,<sup>86</sup> while arms control recognises that “we cannot get rid of armaments. So, the best we can do is to reduce the likelihood of their being used. It aims to do this by mutual restraints on armaments, their production, deployment and numbers.”<sup>87</sup> Thus, according to Sir Clive Ross’ approach, the weapons prohibition approach, combined with non-proliferation seems to constitute arms control moving towards the goal of achieving disarmament. In this interpretation, Sassòli notes that in these instances of prohibition “the relevant treaties are situated on a sliding scale between IHL and disarmament law”<sup>88</sup> and thus, ‘disarmament’ speaks to an outright prohibition that expands beyond just the prohibition of the weapon to also address the prohibition of weapons transfer or stockpiling.

This extension of the prohibition of a weapon into reductions of stockpiles and prohibition of transfer sees an extension into non-proliferation, such as that associated with nuclear weapons as seen with the 1968 NPT.<sup>89</sup> Crawford and Vu also refer to “strategic arms

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<sup>84</sup> Sean Watts, ‘Regulation-Tolerant Weapons, Regulation-Resistant Weapons and the Law of War’ (2015) 91 *International Law Studies* 540, 542.

<sup>85</sup> Sir Clive Rose, ‘Multiple Approaches to Arms Control and Disarmament’ (1982) 38(11) *The World Today* 422.

<sup>86</sup> *Ibid.*

<sup>87</sup> *Ibid.*

<sup>88</sup> Marco Sassòli and Patrick S Nagler, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar Publishing 2019) 39.

<sup>89</sup> 1968 Non-Proliferation Treaty.

control”<sup>90</sup> measures that specifically target the arsenals of specific powerful military States. This form of weapons regulation was prevalent in the 1960s and 1970s, specifically with regards to nuclear weapons. However, the NPT also served to consolidate the power of the United States and the then USSR, in an approach that is discussed with respect to Bull in the theories of regulation section of this chapter. The non-proliferation requirement resulted in nuclear weapons not coming into the possession of non-nuclear States, which resulted in the advantage and the constant threat of use of their nuclear weapons remaining solely with the nuclear States.

Prevention of the transfer of weapons was also seen to accompany the prohibition on both biological weapons<sup>91</sup> and chemical weapons,<sup>92</sup> both of which tend to be considered weapons of mass destruction alongside nuclear weapons, with Fidler noting that “[h]istorically, the most prominent and direct use of international law in connection with WMD was through arms control treaties-international agreements designed to prohibit or limit the development, possession, and use of nuclear, chemical, and biological weapons by states.”<sup>93</sup> Thus, the prohibition of these weapons could also be considered to be part of a disarmament process.

Nevertheless, while weapons prohibitions can and have been accompanied by clauses preventing stockpiling or transfer or requiring non-proliferation in IHL instruments, this does not negate the status of the instruments dealing with nuclear, chemical or biological

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<sup>90</sup> Timothy W. Crawford & Khang X. Vu, ‘Arms Control as Wedge Strategy: How Arms Limitation Deals Divide Alliances’ (2021) 46(2) *International Security* 91, 94.

<sup>91</sup> 1972 Biological Weapons Convention.

<sup>92</sup> 1993 Chemical Weapons Convention.

<sup>93</sup> David P. Fidler, ‘International Law and Weapons of Mass Destruction: End of the Arms Control Approach?’ (2004) 417 *Articles by Maurer Faculty* 39, 41.

weapons as IHL instruments. The ICRC recognises biological and chemical weapons prohibitions in the ICRC customary IHL database in Rules 73 and 74 respectively.<sup>94</sup>

As noted at the beginning of this section, an alternative approach to that of the prohibition of weapons use is placing limitations on weapons use under certain circumstances. This research refers to such measures as weapons regulation/limitation. As the following section discusses, weapons that are regulated/limited are not of a nature where they will always cause unnecessary suffering and superfluous injury. Their use in the circumstances in which they will cause such unnecessary suffering is restricted, but their use in other circumstances is permitted.

#### **4.4.2.3 Weapons Regulation/Limitation**

Weapons that are subject to regulation or limitation are not inherently contrary to IHL but are subject to certain restrictions with regards to their use in specific ways or in certain contexts or domains of use. This is as a result of their use in these ways or contexts being contrary to IHL. As Mickevičiūtė describes, this is “restriction upon the manner of deployment of specific weapons”<sup>95</sup> as opposed to the previously discussed outright prohibition.

Examples of weapons regulation could be seen with regards to mines or booby traps as regulated in Protocol II of the 1980 CCW,<sup>96</sup> which places limitations on the placement of such weapons depending on their position relative to military objectives. While, as

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<sup>94</sup> ICRC International Humanitarian Law Databases, ‘Rules’ <<https://ihl-databases.icrc.org/en/customary-ihl/v1>> accessed 27 September 2023, rule 73 and 74.

<sup>95</sup> Neringa Mickevičiūtė, ‘Lessons from the Past for Weapons of the Future’ (2016) 2 *International Comparative Jurisprudence* 99, 100.

<sup>96</sup> Protocol on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices, 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 (adopted 10 October 1980, entered into force 2 December 1983) 1342 UNTS 137 (1980 Protocol II to the 1980 Convention on Certain Conventional Weapons).

illustrated in Section 4.5, land mines are prohibited for the States that are parties to the 1997 Anti-Personnel Mine Ban Convention,<sup>97</sup> the approach taken in Protocol II does illustrate a regulation approach. It is also an example of placing limitations on a weapon's use in a particular context or domain, which is useful when forming recommendations for the regulation of weapons in a specific domain, as this research does with regards to the domain of Outer Space.

The approach that this research will recommend with regards to weapons use in Outer Space is that of regulation/limitation as opposed to an express prohibition, such as that discussed above. The approaches seen to be taken to weapons, both prohibitive and regulatory, in past IHL instruments are discussed further in Section 4.5. However, the following section deals with a concept that is often cited with respect to nuclear weapons, weapons of mass destruction and Outer Space - that deterrence acts as a form of regulation of weapons use.

#### **4.4.2.4 Deterrence - A Form of Weapons Regulation?**

When discussing the regulation of weapons use, particularly with respect to nuclear weapons, there is discussion around whether deterrence is an effective form of weapons regulation. This would involve permitting States that have nuclear weapons in their military arsenals to retain them with the general impression being that these weapons will not be used by these parties as use by one would trigger use by the other(s) and total destruction would ensue. It is evident that the previously-discussed 1968 NPT<sup>98</sup> hinged on this impression.

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<sup>97</sup> 1997 Anti-Personnel Mine Ban Convention.

<sup>98</sup> 1968 Non-Proliferation Treaty.

Based on the previous experience with nuclear weapons and the fact that they have not been used since WWII, there are many advocates for the successes of deterrence. For example, in 1982, Sir Clive Rose highlighted that the non-occurrence of a war since WWII was “not due to disarmament, multilateral or unilateral, but to nuclear deterrence - or, to use a well-worn but still apt expression, to the 'balance of terror'.”<sup>99</sup> For the purpose of this research, a discussion of the interpretation of deterrence and mutual fear between weapons-owning States as a means of weapons regulation is significant as this interpretation is similarly put forward with regards to weapons use in Outer Space, with Kopeć noting that “there are voices that a doctrine of deterrence in outer space, which could draw from the experience of Cold War nuclear deterrence, is needed”.<sup>100</sup>

Kenny identifies two categories of proponents for nuclear deterrence specifically, composed of “those who justify possession of nuclear weapons as a deterrent on the grounds that some uses of those weapons may be legitimate, and there are those who defend the possession of nuclear weapons as a deterrent while agreeing that the use of them in all circumstances must be wrong.”<sup>101</sup> Therefore, those who support nuclear deterrence do not necessarily need to agree with the use of nuclear weapons. For the purpose of deterrence, the actual use of nuclear weapons is not necessary, it is the threat of use that causes the mutual fear of consequences.

The latter approach of agreeing to possession of nuclear weapons as a deterrent but not agreeing with their use aligns with the 1982 stance of Pope John Paul II made at the UN, wherein he agreed that “[i]n current conditions "deterrence" based on balance, certainly not as an end in itself but as a step on the way toward a progressive disarmament, may

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<sup>99</sup> Sir Clive Rose, ‘Multiple Approaches to Arms Control and Disarmament’ (1982) 38(11) *The World Today* 422, 429.

<sup>100</sup> Rafał Kopeć, ‘Space Deterrence: In Search of a ‘Magical Formula’” (2019) 47 *Space Policy* 121, 122.

<sup>101</sup> Anthony Kenny, *The Logic of Deterrence* (Firethorn Press 1985) 38-39.

still be judged morally acceptable. Nonetheless in order to ensure peace, it is indispensable not to be satisfied with this minimum which is always susceptible to the real danger of explosion”.<sup>102</sup> Kenny also believes that this approach aligns with the deterrence theory, because “[t]he point of deterrence is to provide an input to the practical reasoning of a potential adversary. If an adversary proves to be undeterred, then the deterrent has failed to be effective at the time when it was purported to be effective by a retaliatory strike. Thus far, then, deterrence without use seems possible.”<sup>103</sup> However, is the constant threat of use of nuclear weapons necessary in order for deterrence to be effective? Kenny notes that as opposed to a genuine intention, “[a] mere willingness to use the weapons will suffice, a willingness which consists in preserving their use as a genuine option.”<sup>104</sup> Thus, the presence of nuclear weapons in a State’s military arsenal as an option which a State can use would sufficiently deter action from another nuclear State. Deterrence was successful in respect of nuclear weapons,<sup>105</sup> so the question arises as to whether deterrence is an effective means of preventing weapons use in Outer Space presently? The destruction that would result from weapons use in Outer Space could be significant and the potential of States to lose their valuable and necessary space assets, such as satellites and the communications and information that they provide, could be enough to generate mutual fear among States to avoid weapons use. However, as Kopeć highlights, “no deterrence strategy is able to reduce the risk of attacking to zero. Thus, deterrence should not be the only tool in the arsenal of measures used by the state, but

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<sup>102</sup> Pope John Paul II, ‘Message of His Holiness Pope John Paul II to the General Assembly of the United Nations’ (Vatican, 7 June 1982) <[https://www.vatican.va/content/john-paul-ii/en/messages/pont\\_messages/1982/documents/hf\\_jp-ii\\_mes\\_19820607\\_disarmo-onu.html](https://www.vatican.va/content/john-paul-ii/en/messages/pont_messages/1982/documents/hf_jp-ii_mes_19820607_disarmo-onu.html)> accessed 6 August 2023.

<sup>103</sup> Anthony Kenny, *The Logic of Deterrence* (Firethorn Press 1985) 47.

<sup>104</sup> *Ibid* 50.

<sup>105</sup> Rafał Kopeć, ‘Space Deterrence: In Search of a ‘Magical Formula’’ (2019) 47 *Space Policy* 121, 122: “[n]onetheless, Gray and many strategic thinkers and military historians (e.g., Michael Howard) have acknowledged that nuclear deterrence was resoundingly successful through four and a half decades of the Cold War, discouraging rivals from using military force to achieve its political objectives.”

one of the wider ranges of instruments under the national security strategy.”<sup>106</sup> Thus, the need for binding weapons regulation instruments, the recommendations for which this research forms, is still required alongside deterrence which cannot in and of itself function as a means of weapons regulation.

Having investigated the main approaches to weapons regulation in IHL, how these approaches were applied in previous weapons regulation instruments is analysed in the following section.

#### **4.5 Weapons Regulation Instruments in IHL**

Weapons regulation can be seen in IHL in the form of instruments of prohibition, limitation and in the case of nuclear weapons and weapons of mass destruction, non-proliferation, as discussed in the previous section. All of these instruments sought to place limitations on weapons which were excessively injurious in nature and thus, contrary to the maintenance of humanity in warfare. This section tracks some of the most significant developments in weapons regulation in IHL in terms of binding legal instruments. This history of the development of the instruments of weapons regulation in IHL is important for this research as the approaches taken towards regulating weapons use in the past will serve to inform the recommendations that this research forms for regulating the use of weapons in Outer Space.

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<sup>106</sup> Ibid.

#### 4.5.1 1868 St Petersburg Declaration<sup>107</sup>

The St Petersburg Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight<sup>108</sup> is recognised as “the first formal agreement prohibiting the use of certain weapons in war”,<sup>109</sup> having been spear-headed by Russia with the intention of ensuring that explosive projectiles would not be used against its own armed forces. The express term ‘prohibition’ is not used and instead, Parties to the Declaration agree “to renounce, in case of war among themselves, the employment by their military or naval troops of any projectile of a weight below 400 grammes, which is either explosive or charged with fulminating or inflammable substances”.<sup>110</sup> Nevertheless, Bring notes that explosive projectiles under 400 grammes stopped being produced and as a result, “[a] certain disarmament or arms limitation effect had been achieved de facto, albeit not de jure.”<sup>111</sup>

The principles of IHL are outlined in the Declaration, with the principle of military necessity reiterated, noting that “the only legitimate object which States should endeavour to accomplish during war is to weaken the military forces of the enemy”.<sup>112</sup> Furthermore, the “laws of humanity”<sup>113</sup> are referenced as a rationale for the renunciation of these weapons. Watts also notes that “[i]nternational codification of the principle of unnecessary suffering is traceable to the 1868 St. Petersburg Declaration”,<sup>114</sup> with it outlined that the use of explosive projectiles were excessively injurious in the sense that

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<sup>107</sup> 1868 St. Petersburg Declaration.

<sup>108</sup> Ibid.

<sup>109</sup> ICRC, ‘Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight. Saint Petersburg, 29 November / 11 December 1868’ <<https://ihl-databases.icrc.org/ihl/full/declaration1868> > accessed 1 April 2022.

<sup>110</sup> 1868 St. Petersburg Declaration.

<sup>111</sup> Ove Bring, ‘Regulating Conventional Weapons in the Future. Humanitarian Law or Arms Control’ (1987) 24(3) *Journal of Peace Research* 275, 276.

<sup>112</sup> 1868 St. Petersburg Declaration.

<sup>113</sup> Ibid.

<sup>114</sup> Sean Watts, ‘Regulation-Tolerant Weapons, Regulation-Resistant Weapons and the Law of War’ (2015) 91 *International Law Studies* 540, 546.

they are “arms which uselessly aggravate the sufferings of disabled men, or render their death inevitable”.<sup>115</sup> Furthermore, as noted by Wexler, because “this principle is now part of customary international law, it governs all states that do not consistently and unequivocally reject this principle”.<sup>116</sup> All States’ choice of weapons during the conduct of hostilities are thus bound by the obligation not to use weapons which cause unnecessary suffering and superfluous injury. The inclusion of these principles in the Declaration illustrates their foundational nature in IHL and specifically weapons regulation law and as the first formal agreement of weapons regulation, laid an important foundation for the integration of the principles of IHL into instruments moving forward. This was evidenced by the adoption of the Marten Clause in the 1899 Hague Convention II.

#### **4.5.2 1899 Hague Convention (II)<sup>117</sup>**

The Hague Convention (II) with Respect to the Laws and Customs of War on Land<sup>118</sup> contributed significantly not just to weapons regulation law, but to IHL as a whole, including the Martens Clause in the preamble of the instrument as follows:

“[u]ntil a more complete code of the laws of war is issued, the High Contracting Parties think it right to declare that in cases not included in the Regulations adopted by them, populations and belligerents remain under the protection and empire of the principles of international law, as they result from usages established between civilized nations, from the laws of humanity, and the requirements of public conscience.”<sup>119</sup>

As in the 1868 St Petersburg Declaration,<sup>120</sup> the ‘laws of humanity’ are referenced. Furthermore, through what Watts describes as “a novel role as law of war gap filler”<sup>121</sup>

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<sup>115</sup> 1868 St. Petersburg Declaration.

<sup>116</sup> Lesley Wexler, ‘Limiting the Precautionary Principle: Weapons Regulation in the Face of Scientific Uncertainty’ (2006) 39(2) U.C. Davis Law Review 459, 481.

<sup>117</sup> 1899 Hague Convention II.

<sup>118</sup> Ibid.

<sup>119</sup> Ibid preamble.

<sup>120</sup> 1868 St. Petersburg Declaration.

<sup>121</sup> Sean Watts, ‘Regulation-Tolerant Weapons, Regulation-Resistant Weapons and the Law of War’ (2015) 91 International Law Studies 540, 556.

that the Martens Clause has gained in IHL, this clause set the ‘laws of humanity’ as the minimum standard for conduct in armed conflict, including in instances where weapons technologies are yet to be subject to express regulation through an international instrument, as Chapter 2 outlines. The significance of the Martens Clause is also evident from the inclusion of the clause in many subsequent IHL instruments.<sup>122</sup>

In addition to the Martens Clause, the 1899 Hague Convention II outlines in Article 22 with respect to means of warfare that “[t]he right of belligerents to adopt means of injuring the enemy is not unlimited”,<sup>123</sup> and Article 23 outlines that “[b]esides the prohibitions provided by special Conventions, it is especially prohibited (a) To employ poison or poisoned arms...(e) To employ arms, projectiles, or material of a nature to cause superfluous injury”.<sup>124</sup> These provisions continue to emphasise the objective of rendering armed conflict as ‘humane’ as possible through limiting weapons choice available to States and thus, limiting the destruction and unnecessary suffering of armed conflict.

#### **4.5.3 1899 Hague Declaration (IV, 3)<sup>125</sup>**

In the same year, the Hague Declaration (IV, 3) concerning Expanding Bullets,<sup>126</sup> also known as dum dum bullets, was introduced. This weapons regulation instrument focused on “particular technical specifications about a weapon system, namely, the construction of bullets”.<sup>127</sup> Expanding bullets were deemed to be excessively injurious because “[i]n

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<sup>122</sup> 1907 Hague Convention, preamble; 1949 Geneva Convention I, art 63; 1949 Geneva Convention II, art 62; 1949 Geneva Convention III, art 142; 1949 Geneva Convention IV, art 158; 1977 Additional Protocol I, art 1(2); 1977 Protocol Additional II, preamble; 1980 Convention on Certain Conventional Weapons, preamble.

<sup>123</sup> 1899 Hague Convention II, art 22.

<sup>124</sup> 1899 Hague Convention II, art 23.

<sup>125</sup> 1899 Hague Declaration (IV, 3).

<sup>126</sup> Ibid.

<sup>127</sup> Robin Coupland and Dominique Loye, ‘The 1899 Hague Declaration Concerning Expanding Bullets. A treaty effective for more than 100 years faces complex contemporary issues’ (2003) 85(849) *International Review of the Red Cross* 135.

the late 1890s it was reported in medical literature that the wounds produced by military rifle bullets with lead exposed at their tips were larger than those produced by others.”<sup>128</sup> The creation of larger wounds upon impact with the body could be deemed to cause unnecessary suffering for victims, some of whom were natives of lands colonised by the British army.<sup>129</sup>

Thus, the declaration, which outlined that its purpose and formation was “inspired by the sentiments which found expression in the Declaration of St. Petersburg”<sup>130</sup> of 1868, obliges States parties to “abstain from the use of bullets which expand or flatten easily in the human body”.<sup>131</sup> With this reference to the St. Petersburg Declaration,<sup>132</sup> the instrument links back to the ‘laws of humanity’ referenced in that instrument. Furthermore, the perspective of ensuring ‘humane’ standards of armed conflict are evidenced in Coupland and Loye’s descriptions of the negotiations for the creations of the Hague Declaration (IV, 3) concerning Expanding Bullets.<sup>133</sup> It is described that the British delegates condoned the use of dum dum bullets in their colonial pursuits against native peoples, who they described as “savages”.<sup>134</sup> However, it was noted by the Sub-Commission to the First Commission to the 1899 Hague Peace Conference<sup>135</sup> that this contestation was “contrary to the humanitarian spirit”.<sup>136</sup>

This declaration proves insightful for this research in the analysis of the regulation of conventional weapons, the use of which is not prohibited in Outer Space, as it was “the only treaty- based prohibition on a conventional weapon in widespread use until the mine

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<sup>128</sup> Ibid 136.

<sup>129</sup> Ibid.

<sup>130</sup> 1899 Hague Declaration (IV, 3).

<sup>131</sup> Ibid.

<sup>132</sup> 1868 St. Petersburg Declaration.

<sup>133</sup> 1899 Hague Declaration (IV, 3).

<sup>134</sup> Robin Coupland and Dominique Loye, ‘The 1899 Hague Declaration Concerning Expanding Bullets. A treaty effective for more than 100 years faces complex contemporary issues’ (2003) 85(849) *International Review of the Red Cross* 135, 137.

<sup>135</sup> Ibid 136.

<sup>136</sup> Ibid 137.

ban treaty nearly 100 years later.”<sup>137</sup> Bryden also notes an interesting approach taken to weapons regulation in this Declaration (and arguably to a certain extent in the 1868 St Petersburg Declaration<sup>138</sup>) which mitigated against potential weaknesses of only relying on the principles of IHL to describe a rationale for regulation. In the instance of dum dum bullets, it was decided that “[a] prohibition based on design characteristics was necessary to prevent states finding loopholes in their obligations. Linking the ban to more general principles of IHL would have given ample opportunity for applying different interpretations.”<sup>139</sup> This approach has contributed to the trend of weapons regulation instruments that followed, with prohibition being based on a characteristic of a weapon. However, the limitations of this approach are also highlighted by Bryden, who notes that “[b]y basing the prohibition on a technical characteristic, the regime has lacked the flexibility to adapt to developments in firearms and ammunition since 1899.”<sup>140</sup> Thus, the introduction of a prohibition based on the characteristics of dum-dum bullets was too specific to assist in the prohibition of the developments that followed with regards to guns and projectiles.

Thus, much can be drawn from the 1899 Hague Declaration (IV, 3) that can inform weapons regulation instruments that followed, but also those of the future. While, as noted, the prohibition or regulation of a weapon due to a specific characteristic can be seen to have persisted in weapons regulation instruments with examples such as the prohibitions of land mines,<sup>141</sup> cluster munitions,<sup>142</sup> etc., it is not a panacea. The characteristic itself is prohibited, but weapons design and development can quickly render

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<sup>137</sup> Alan Bryden, *International Law, Politics and Inhuman Weapons: The Effectiveness of Global Landmine Regimes* (Taylor & Francis Group 2012) 17.

<sup>138</sup> 1868 St. Petersburg Declaration.

<sup>139</sup> Alan Bryden, *International Law, Politics and Inhuman Weapons: The Effectiveness of Global Landmine Regimes* (Taylor & Francis Group 2012) 22.

<sup>140</sup> *Ibid* 23.

<sup>141</sup> 1997 Anti-Personnel Mine Ban Convention.

<sup>142</sup> 2008 Convention on Cluster Munitions.

such a prohibition redundant. It is for this reason that the recommendations of this research focus on the use of weapons in a specific domain – that of Outer Space. This research contends that developments with regards to Outer Space technologies are ever-evolving and it is likely that the most advanced Space weapons in States military arsenals are not those outlined in Chapter 6, but instead have not yet been demonstrated for the rest of the world to witness. Waiting until a weapon is tested or used to discover its unique characteristics could result in the occurrence of unnecessary suffering prior to any prohibition or limitation being introduced. Furthermore, as Chapter 1 mentioned and Chapter 6 discusses in more detail, it is not just technologically-advanced weapons that can be used in Outer Space. Pre-existing conventional weapons that are already in States' military arsenals and that are not currently subject to specific regulations/limitations based on their characteristics can function in Outer Space. For this reason, regulation based on the characteristic of a weapon would likely result in a weapons regulation instrument that would lack flexibility, as was the case with the regulation of dum dum bullets.

#### **4.5.4 1977 Additional Protocol I to the 1949 Geneva Conventions<sup>143</sup>**

The first Additional Protocol to the 1949 Geneva Conventions<sup>144</sup> contains what is referred to as the 'Basic Rule' with respect to weapons use in armed conflict situations in Article 35, outlined as follows:

- “1. In any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited.
2. It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.
3. It is prohibited to employ methods or means of warfare which are intended, or

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<sup>143</sup> 1977 Additional Protocol I.

<sup>144</sup> 1949 Geneva Conventions I – IV.

may be expected, to cause widespread, long-term and severe damage to the natural environment.”<sup>145</sup>

In this Article the limitation on the choice of weapons and the prohibition of weapons that result in unnecessary suffering are evident and consolidated with the additional reference to weapons or means of warfare that could cause damage to the environment. This reference to ensuring that a natural environment is not affected by weapons use, which could involve damage caused to crops, soil or water supplies that could cause long-term effects for civilians and future generations, is also based on the crux of ‘humane’ warfare, as well as the obvious violations of the principle of distinction. The protection of the environment in weapons use is also illustrated in Article 55(1), which notes that ensuring the protection of the environment in armed conflict situations “includes a prohibition of the use of methods or means of warfare which are intended or may be expected to cause such damage to the natural environment and thereby to prejudice the health or survival of the population.”<sup>146</sup> This protection is significant as damage to the environment can remain long after a weapons use and its consequences must be considered not only for the civilian population at the time, but also for future generations. This is evident of the need to interpret the principle of humanity, the lens of this research, and its aim to reduce unnecessary suffering with the impact on humankind as a whole, present and future, in mind. Such an interpretation of humankind as a whole is being adopted by this research in forming the recommendations for the regulation of the use of weapons in Outer Space as it is humankind, present and future, that could fall victim to weapons use in the Outer Space environment.

This ‘Basic Rule’ of Article 35 is followed by Article 36 specifically applying to weapons development and how this process should be pursued by States Parties with an analysis

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<sup>145</sup> 1977 Additional Protocol I, art 35.

<sup>146</sup> 1977 Additional Protocol I, art 55.

of “whether its [a weapons] employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law”.<sup>147</sup> Thus, the development of new weapons should be pursued with consideration for the ‘Basic Rule’ of this instrument, as well as other IHL instruments and the principles of IHL in an attempt to stem the creation of more excessively injurious weapons, which would then require more weapons regulation measures and instruments. The obligation of the legal review of new weapons imposed upon States by Art 36 was elaborated upon by the ICRC in an express guide on the procedure that States should undertake.<sup>148</sup> The aim of the review process in Art 36 was essentially to prevent the development and/or deployment of illegal weapons by “determining their lawfulness before they are developed, acquired or otherwise incorporated into a State's arsenal.”<sup>149</sup> Thus, the review process was intended to prohibit newly-emerged or emerging weapons technologies which demonstrated illegality before these weapons could be fielded in hostilities.

Nevertheless, despite the provision for such a review process, it is evident that while States should review the legality of new weapons technologies, that is not always the case. However, many weapons that are determined as legal through an Art 36 review process could still be deemed to warrant regulation – some such weapons could be described as conventional weapons, the prohibition and regulation of some of which is provided for in the following instrument.

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<sup>147</sup> 1977 Additional Protocol I, art 36.

<sup>148</sup> ICRC, ‘A Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measure to Implement Article 36 of Additional Protocol I of 1977’ (January 2006) <[https://www.icrc.org/en/doc/assets/files/other/icrc\\_002\\_0902.pdf](https://www.icrc.org/en/doc/assets/files/other/icrc_002_0902.pdf)> accessed 10 May 2022.

<sup>149</sup> Ibid 4.

#### 4.5.5 1980 Convention on Certain Conventional Weapons<sup>150</sup>

Originally formed with just three protocols, the CCW is unique as it can be said to adopt both a prohibition and a weapons regulation approach. Protocol I prohibits the use of “any weapon the primary effect of which is to injure by fragments which in the human body escape detection by X-rays”.<sup>151</sup> Protocol II<sup>152</sup> prohibits the use of mines, booby-traps and other devices against a civilian population and sets limitations around their use with respect to their proximity to a military objective and the recording of their location. Protocol III<sup>153</sup> deals with, similar to that of Protocol II, prohibition, and restriction on incendiary weapons. The original three Protocols of the Convention illustrate both the prohibition and regulation approaches being adopted in the instrument with respect to different weapons.

In 1998 there was the addition of Protocol IV,<sup>154</sup> which as Mickevičiūtė notes, serves as an example that “it is possible to exert pressure and achieve regulatory success without actually fielding the weapon.”<sup>155</sup> This is because the prohibition on the employment of “laser weapons specifically designed, as their sole combat function or as one of their combat functions, to cause permanent blindness to unenhanced vision, that is to the naked eye or to the eye with corrective eyesight devices”<sup>156</sup> was introduced before these

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<sup>150</sup> 1980 Convention on Certain Conventional Weapons.

<sup>151</sup> Protocol Concerning Nondetectable Fragments, 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 (adopted 10 October 1980, entered into force 2 December 1983) 1342 UNTS 137 (1980 Protocol I to the 1980 Convention on Certain Conventional Weapons).

<sup>152</sup> 1980 Protocol II to the 1980 Convention on Certain Conventional Weapons.

<sup>153</sup> Protocol on Prohibitions or Restrictions on the Use of Incendiary Weapons, 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 (adopted 10 October 1980, entered into force 2 December 1983) 1342 UNTS 137 (1980 Protocol III to the 1980 Convention on Certain Conventional Weapons).

<sup>154</sup> 1995 Protocol IV to the 1980 Convention on Certain Conventional Weapons.

<sup>155</sup> Neringa Mickevičiūtė, ‘Lessons from the Past for Weapons of the Future’ (2016) 2 International Comparative Justice 99, 100.

<sup>156</sup> 1995 Protocol IV to the 1980 Convention on Certain Conventional Weapons, art 1.

weapons had been used in armed conflict situations. The final protocol is Protocol V, adopted in 2006, which deals with explosive remnants of war.<sup>157</sup>

These protocols, and any additional protocols which may be created in the future, are annexed to the central CCW, which was adopted in 1980 and updated in 2001 and which, in its Preamble, expresses that as an instrument it is based on “the principle of international law that the right of the parties to an armed conflict to choose methods or means of warfare is not unlimited, and on the principle that prohibits the employment in armed conflicts of weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering”.<sup>158</sup> Thus, the principle of humanity is placed at the centre of the CCW and the role of this instrument in the IHL framework.

This is a unique Convention in its structure and dual prohibition and regulation approach specific to the conventional weapon being dealt with within each protocol and the principle of humanity is again re-iterated as underpinning this instrument and its aims with the inclusion of the Martens Clause in the preamble. It is the flexible structure and approach of the CCW that often make it the subject of attention when new weapons technologies emerge that spark discussions of regulation as new Protocols can be annexed to the Convention.

The weapons regulation instruments discussed in this section have served to illustrate the centrality of the principle of humanity in weapons regulation through the creation and subsequent inclusion of the Martens Clause in many of the instruments, as well as highlighting the trend that weapons regulation, specifically the regulation of conventional

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<sup>157</sup> Protocol on Explosive Remnants of War, 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 (adopted 28 November 2003, entered into force 12 November 2006) 2399 UNTS 100 (2003 Protocol V to the 1980 Convention on Certain Conventional Weapons).

<sup>158</sup> 1980 Convention on Certain Conventional Weapons, preamble.

weapons in the cases of the 1899 Hague Declaration (IV,3)<sup>159</sup> and the 1980 CCW,<sup>160</sup> has followed with regards to regulation or prohibition of a technological characteristic of a weapon, as seen with explosive projectiles and expanding bullets. The regulation of the weapons discussed in the following sub-sections, chemical and biological weapons, are illustrative of the approaches that have been taken towards regulating what are considered as weapons of mass-destruction in IHL.

#### **4.5.6 Chemical and Biological Weapons Regulation**

The approach taken towards weapons regulation in the instances of chemical and biological weapons began with outright prohibition of these weapons categories and eventually extended towards a prohibition on production and stockpiling, with the goal being to eliminate “such dangerous weapons of mass destruction as those using chemical or bacteriological (biological) agents”.<sup>161</sup> This complete disarmament approach was underpinned by considerations for “the sake of all mankind”,<sup>162</sup> which arguably references the principle of humanity in sparing humankind from the injury and suffering that result from the use of weapons of mass destruction.

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<sup>159</sup> 1899 Hague Declaration (IV, 3).

<sup>160</sup> 1980 Convention on Certain Conventional Weapons.

<sup>161</sup> 1972 Biological Weapons Convention, preamble.

<sup>162</sup> Ibid: “[d]etermined, for the sake of all mankind, to exclude completely the possibility of bacteriological (biological) agents and toxins being used as weapons”. See also 1993 Chemical Weapons Convention, preamble: “[d]etermined for the sake of all mankind, to exclude completely the possibility of the use of chemical weapons, through the implementation of the provisions of this Convention, thereby complementing the obligations assumed under the Geneva Protocol of 1925”.

#### 4.5.6.1 1925 Gas Protocol on Gas and Bacteriological Warfare<sup>163</sup>

The 1925 Protocol provided for the outright prohibition of “the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, material or devices”,<sup>164</sup> as well as extending this prohibition to “the use of bacteriological methods of warfare”.<sup>165</sup> Sir Adam Roberts notes that this instrument of weapons regulation “reflects a long-standing revulsion against the use of such weapons that had already found expression in the 1899 Hague Declaration II on asphyxiating gases, and in an article of the 1907 Hague land war regulations”.<sup>166</sup> Thus, while the prohibition was already in existence, it was included in an instrument of prohibition of its own and also extended to the related but distinct category of bacteriological weapons. This distinction of gases and bacteriological weapons from other forms of warfare was further built upon in the following two weapons regulation instruments. The development of the prohibitions on biological weapons and chemical weapons from the 1925 Gas Protocol to the weapons regulation instruments discussed in the following sub-sections are informative for this research and the recommendations for an instrument regulating the use of weapons in Outer Space formed in this thesis. These weapons regulation instruments are illustrative of the approach of prohibition of weapons based on their inherent characteristics. Understanding of the different approaches to the regulation of weapons and the focus of this regulation provides the foundation of the recommendations of this research, which are outlined in Chapter 7.

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<sup>163</sup> 1925 Geneva Gas Protocol.

<sup>164</sup> *Ibid.*

<sup>165</sup> *Ibid.*

<sup>166</sup> Sir Adam Roberts, ‘Future War, Future Law: A Historical Approach’ in Matthew C. Waxman & Thomas W. Oakley (eds) *The Future Law of Armed Conflict* (Lieber Studies Vol 7, Oxford University Press 2022) 16.

#### 4.5.6.2 1972 Biological Weapons Convention<sup>167</sup>

The Biological Weapons Convention<sup>168</sup> is recognised as being “the first multilateral disarmament treaty banning an entire category of weapons of mass destruction”.<sup>169</sup> The Convention prohibits the development, production, stockpiling or retaining<sup>170</sup> of

“(1) microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes;

(2) weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict.”<sup>171</sup>

Thus, rather than just prohibiting the use of such substances, or their use in weapons, in armed conflict situations, the Convention also extends this prohibition to production and stockpiling of these substances or weapons. This is indicative of the difference between a disarmament approach and a prohibition approach, both of which are discussed in greater depth in Section 4.4.

The aim to totally eliminate these weapons is further consolidated by the obligation placed upon States “to destroy, or to divert to peaceful purposes...all agents, toxins, weapons, equipment and means of delivery specified”.<sup>172</sup> Thus, the disarmament process requires States to actively destroy these weapons, as well as not bringing them into existence. This approach was also taken with regards to the related category of chemical weapons.

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<sup>167</sup> 1972 Biological Weapons Convention.

<sup>168</sup> Ibid.

<sup>169</sup> United Nations Office for Disarmament Affairs, ‘Biological Weapons Convention’ <<https://disarmament.unoda.org/biological-weapons/>> accessed 17 May 2023.

<sup>170</sup> 1972 Biological Weapons Convention, art 1 notes that “[e]ach State Party to this Convention undertakes never in any circumstances to develop, produce, stockpile or otherwise acquire or retain”.

<sup>171</sup> Ibid art I.

<sup>172</sup> Ibid art II.

#### 4.5.6.3 1993 Chemical Weapons Convention<sup>173</sup>

Despite the existence of the 1925 Gas Protocol,<sup>174</sup> “the use of chemical weapons in several conflicts gave impetus for negotiations to achieve disarmament of chemical weapons and an international system of inspection and verifications.”<sup>175</sup> The Organisation for the Prohibition of Chemical Weapons (OPCW) was established to oversee this inspection and verification, as well as the implementation of the Chemical Weapons Convention.<sup>176</sup> In 2013, the OPCW was awarded the Nobel Peace Prize because of “its efforts in eliminating the scourge of chemical warfare,”<sup>177</sup> with the mandate of the OPCW outlined by the Chemical Weapons Convention.

The formation of the Convention was pre-empted in Article IX of the Biological Weapons Convention,<sup>178</sup> with the view to eliminate the existence of both forms of weapons of mass destruction. As previously noted, the approach taken towards these weapons involves prohibiting production and stockpiling, as well as the destruction of those weapons already in existence. The destruction of the world’s stockpiles of chemical weapons has been significant, with 100% of the stockpiles of declared chemical weapons destroyed as of July 2023.<sup>179</sup>

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<sup>173</sup> 1993 Chemical Weapons Convention.

<sup>174</sup> 1925 Geneva Gas Protocol.

<sup>175</sup> Sir Adam Roberts, ‘Future War, Future Law: A Historical Approach’ in Matthew C. Waxman & Thomas W. Oakley (eds) *The Future Law of Armed Conflict* (Lieber Studies Vol 7, Oxford University Press 2022) 17.

<sup>176</sup> 1993 Chemical Weapons Convention.

<sup>177</sup> Jefferson Morley, ‘Chemical Watchdog Wins Nobel Prize’ (2013) 43(9) *Arms Control Today* 38.

<sup>178</sup> 1972 Biological Weapons Convention, art IX: “[e]ach State Party to this Convention affirms the recognised objective of effective prohibition of chemical weapons and, to this end, undertakes to continue negotiations in good faith with a view to reaching early agreement on effective measures for the prohibition of their development, production and stockpiling and for their destruction, and on appropriate measures concerning equipment and means of delivery specifically designed for the production or use of chemical agents for weapons purposes.”

<sup>179</sup> Organisation of the Prohibition of Chemical Weapons, ‘OPCW by the Numbers’ <<https://www.opcw.org/media-centre/opcw-numbers>> accessed 16 September 2023; “[w]orld’s declared chemical weapons stockpiles destroyed: 100%”.

The approach taken in IHL towards chemical and biological weapons, recognised as weapons of mass destruction, is an example of disarmament underpinned by the considerations of the “sake of all mankind”<sup>180</sup> and thus, of the principle of humanity. Another category of weapons of mass destruction that underwent a process of regulation was that of nuclear weapons, as discussed in the next section.

#### **4.5.7 Nuclear Weapons Regulation**

As noted by the ICRC, “[t]he destructive power of nuclear weapons puts them in a category of their own”,<sup>181</sup> and the process of limiting the use of these weapons has taken many stages, finally reaching a binding instrument of prohibition in 2017. Nuclear weapons are of particular relevance for this research with its focus on the domain of Outer Space. That is because the ISL framework has addressed both nuclear weapons testing<sup>182</sup> and the prohibition of the placement of nuclear weapons in Outer Space.<sup>183</sup> These instruments are discussed further Chapter 5, while this section focuses on the process that led towards an instrument of prohibition of nuclear weapons in IHL. This process is informative for this research’s formation of recommendations for the regulation of the use of weapons in Outer Space as different approaches towards weapons regulation are seen throughout the regulation process. This analysis of the regulation of nuclear weapons begins in the aftermath of the nuclear bombings of Hiroshima and Nagasaki during World War II, as outlined in the following sub-section.

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<sup>180</sup> 1972 Biological Weapons Convention, preamble: “[d]etermined, for the sake of all mankind, to exclude completely the possibility of bacteriological (biological) agents and toxins being used as weapons”. See also 1993 Chemical Weapons Convention, preamble: “[d]etermined for the sake of all mankind, to exclude completely the possibility of the use of chemical weapons, through the implementation of the provisions of this Convention, thereby complementing the obligations assumed under the Geneva Protocol of 1925”.

<sup>181</sup> ICRC, ‘Weapons’ (30 November 2011) <<https://www.icrc.org/en/document/weapons> > accessed 31 March 2022.

<sup>182</sup> 1963 Limited Test Ban Treaty.

<sup>183</sup> 1967 Outer Space Treaty, art IV.

#### 4.5.7.1 *Shimoda et al. v the State* [1963]<sup>184</sup> (hereinafter referred to as the Shimoda case)

In 1963, the decision of the Tokyo District Court was delivered with respect to a case brought pursuant to the two atomic bombs that struck Japan at the end of WWII. The applicants in the Shimoda case were residents from Hiroshima and Nagasaki, who were seeking to recover damages in compensation for the destruction caused by the atomic bombs at both sites. Falk notes that the Tokyo District Court delivered its decision on “the twenty- second anniversary of the surprise attack by Japan upon Pearl Harbor”.<sup>185</sup> Having preceded the ICJ’s Advisory Opinion on the *Legality of the Threat or Use of Nuclear Weapons*,<sup>186</sup> the Shimoda case was significant, because at that time, it was “the one and only attempt by a court to assess the legality of atomic, and, by extension, nuclear weapons. The decision thus offers a focus for a more general inquiry into the continuing relevance of the laws of war to the conduct of warfare in the nuclear age”.<sup>187</sup>

The district court limited its interpretation of the legality of the use of atomic bombs to just the use of such weapons in Hiroshima and Nagasaki specifically,<sup>188</sup> so it is important to note that this case is not a holistic decision on the legality of nuclear weapons in all instances on an international scale. The attacks were “pronounced illegal based on their indiscriminate nature (being directed against undefended cities with no concentration of military objectives) and unnecessary suffering they produced”,<sup>189</sup> a decision based on the principles of IHL. However, it was also concluded in this decision that “the use of new weapons was legal if international law did not prohibit it.”<sup>190</sup>

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<sup>184</sup> *Ryuchi Shimoda et al v the State* [1963] Tokyo District Court (Japan).

<sup>185</sup> Richard A. Falk, ‘The Shimoda Case: A Legal Appraisal of the Atomic Attacks Upon Hiroshima and Nagasaki’ (1965) 59(4) *The American Journal of International Law* 759.

<sup>186</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996, para 78.

<sup>187</sup> Richard A. Falk, ‘The Shimoda Case: A Legal Appraisal of the Atomic Attacks Upon Hiroshima and Nagasaki’ (1965) 59(4) *The American Journal of International Law* 759.

<sup>188</sup> *Ibid* 769.

<sup>189</sup> Neringa Mickevičiūtė, ‘Lessons from the Past for Weapons of the Future’ (2016) 2 *International Comparative Justice* 99, 103.

<sup>190</sup> *Ibid*.

Thus, while the decision in the Shimoda case confirmed the illegality of the use of the atomic bombs in Hiroshima and Nagasaki due to their indiscriminate effects and thus, their variance with the principles of IHL; the Tokyo District Court did not address the illegality of atomic bombs or nuclear weapons in general and thus, no impact on the prohibition of nuclear weapons came from the first case analysing the legality of such weapons.

#### **4.5.7.2 1968 Treaty on the Non-Proliferation of Nuclear Weapons<sup>191</sup>**

During the period of the Cold War, the NPT<sup>192</sup> was aimed at preventing the spread of nuclear weapons, keeping in mind “the devastation that would be visited upon all mankind by a nuclear war and the consequent need to make every effort to avert the danger of such a war and to take measures to safeguard the security of peoples”.<sup>193</sup> This reference to mankind and the security of peoples in the preamble of the NPT could be aligned with the principle of humanity in IHL and its role in underpinning the majority of weapons regulation instruments.

Furthermore, the introduction of the NPT was done with the “intention to achieve at the earliest possible date the cessation of the nuclear arms race and to undertake effective measures in the direction of nuclear disarmament”,<sup>194</sup> which, as is discussed below, was not achieved until recent times. Reference is also made in the preamble to the 1963 Limited Test Ban Treaty,<sup>195</sup> an ISL instrument that is discussed in Chapter 5, and how its aims aligned with those of the NPT itself.

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<sup>191</sup> 1968 Non-Proliferation Treaty.

<sup>192</sup> Ibid.

<sup>193</sup> Ibid preamble.

<sup>194</sup> Ibid preamble.

<sup>195</sup> 1963 Limited Test Ban Treaty.

However, the failing of the NPT is the allowance for different treatment between nuclear-weapon States and non-nuclear-weapon States, with the former being obliged to not share their devices with the latter. Which means that, as Bull notes, this sort of weapons regulation instrument does not seek to balance the scales of power between all States. Rather, the differentiation between those States that have nuclear weapons and those that do not serves only to “contribute to a wider process of political cooperation between the great powers, now under threat; and to provide a means of rationalizing the retention of the present high levels of armaments by pointing to ongoing negotiations aimed at their reduction”;<sup>196</sup> with the intentions of the great powers being that the eventual reduction will never occur.

Thus, the NPT as an instrument focused on limiting the spread of nuclear weapons into the majority of States but did not necessarily progress the aim of prohibition in the States that already had nuclear weapons and thus, if anything, served to safeguard the nuclear military arsenals of those States, which gave them a constant advantage of power over the rest of the States of the world. The aims of keeping the peoples of the world safe from the dangers and consequences of nuclear war may have appeared to align with the principle of humanity, but the equitability of the NPT is questionable. The way in which the politics of powerful States can be seen in how the NPT deals with nuclear weapons is also recognisable in attempts at weapons regulation in Outer Space. As Chapter 6 discusses, the escalation of the militarised nature of the Outer Space environment has resulted in it becoming a ‘theatre of warfare’. Politicised actions of States and their Outer Space activities being carried out with their own State interests in mind has fuelled this process of militarisation and also posed challenges to existing weapons regulation attempts for Outer Space. This context, with regards to both the NPT and the politicised

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<sup>196</sup> Hedley Bull, ‘Arms Control and World Order’ (1976) 1(1) *International Security* 3, 14.

nature of Outer Space, informs the recommendations for the regulation of the use of weapons in Outer Space that this research forms. Furthermore, as noted, how these elements align with the principle of humanity as the lens of this research is also an important consideration for this research. The NPT remained the primary instrument regulating nuclear weapons until the introduction of the 2017 prohibition. In the interim, the ICJ delivered an Advisory Opinion on the legality of nuclear weapons use.

#### **4.5.7.3 1996 ICJ Advisory Opinion on the *Legality of the Threat or Use of Nuclear Weapons*<sup>197</sup>**

The analysis of the legality of nuclear weapons before the ICJ in 1996 left, as Docherty notes, “ambiguity about the legality of use”<sup>198</sup> of nuclear weapons. The use of nuclear weapons was concluded as being generally “contrary to the rules of international law applicable in armed conflict, and, in particular, the principles and rules of humanitarian law”.<sup>199</sup> However, the split decision between judges resulted in a definitive decision with regards to the legality or illegality of nuclear weapons not being reached.

With regards to discussion of the principle of humanity, the decision noted, as previously mentioned in this chapter, that the Martens Clause “proved to be an effective means of addressing the rapid evolution of military technology”.<sup>200</sup> However, the interpretation of the clause was not extensively outlined or elaborated upon and thus, as was previously

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<sup>197</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996.

<sup>198</sup> Bonnie Docherty, ‘A ‘light for all humanity’: the treaty on the prohibition of nuclear weapons and the progress of humanitarian disarmament’ (2018) 30(2) *Global Change, Peace and Security* 163, 176.

<sup>199</sup> *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996, p. 226.

<sup>200</sup> *Ibid* para 78.

noted by Meron<sup>201</sup> and echoed by Mickevičiūtė, “it remains unclear if Martens clause could serve as an effective tool to fill any regulatory gaps.”<sup>202</sup>

Thus, the outcome of the ICJ Advisory Opinion did not result in the use of nuclear weapons being declared illegal. Furthermore, while reference was made to the Martens Clause (and the laws of humanity contained therein) and how it can be effective in addressing the development of new weapons technologies, the question of whether it or the principle of humanity alone could serve to prohibit a dangerous or excessively injurious weapon without an express prohibition instrument raised issues again. As previously noted, the placement of nuclear weapons in Outer Space has been prohibited in the ISL since 1967,<sup>203</sup> but the lack of solid conclusion with regards to the legality of nuclear weapons and weapons regulation in general could be seen as a missed opportunity. What did arise in the judgment was the recognition of the continued relevance of the Martens Clause and the principle of humanity in response to the development of weapons technologies specifically. The continued importance of the principle of humanity is the reason why it is adopted as the lens through which this research forms recommendations for the regulation of the use of weapons in Outer Space. It was at the point of uncertainty after the Advisory Opinion that the regulation and aspired-for prohibition of nuclear weapons remained until the late 2010s.

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<sup>201</sup> Theodor Meron, ‘The Martens Clause, Principles of Humanity, and Dictates of Public Conscience’ (2000) 94(1) *The American Journal of International Law* 78, 88 it is noted that “the Martens clause does not allow one to build castles of sand.”

<sup>202</sup> Neringa Mickevičiūtė, ‘Lessons from the Past for Weapons of the Future’ (2016) 2 *International Comparative Justice* 99, 104.

<sup>203</sup> 1967 Outer Space Treaty, art IV.

#### 4.5.7.4 2017 Treaty on the Prohibition of Nuclear Weapons<sup>204</sup>

The Treaty on the Prohibition of Nuclear Weapons was introduced through the UN framework in 2017 and entered into force in January 2021. This instrument has arisen as an arms control instrument applying an express prohibition on nuclear weapons after non-proliferation limitations<sup>205</sup> that unfortunately just fell short of the final aim. However, as Docherty highlights, the 2017 Treaty<sup>206</sup> is illustrative of the “applicability to weapons of mass destruction”<sup>207</sup> of an express prohibition.

The Treaty notes, as many of its weapons regulation predecessor instruments have done in the past, that it is based on

“the principles and rules of international humanitarian law, in particular the principle that the right of parties to an armed conflict to choose methods or means of warfare is not unlimited, the rule of distinction, the prohibition against indiscriminate attacks, the rules on proportionality and precautions in attack, the prohibition on the use of weapons of a nature to cause superfluous injury or unnecessary suffering, and the rules for the protection of the natural environment”.<sup>208</sup>

Furthermore, the preamble of the Treaty clearly outlines the position that “any use of nuclear weapons would be contrary to the rules of international law applicable in armed conflict, in particular the principles and rules of international humanitarian law”<sup>209</sup> and “any use of nuclear weapons would also be abhorrent to the principles of humanity and the dictates of public conscience”.<sup>210</sup>

With recognition of the principles of IHL, including express reference to the principle of humanity, outlined in the preamble, the prohibition of nuclear weapons places an

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<sup>204</sup> 2017 Treaty on the Prohibition of Nuclear Weapons.

<sup>205</sup> 1968 Non-Proliferation Treaty.

<sup>206</sup> 2017 Treaty on the Prohibition of Nuclear Weapons.

<sup>207</sup> Bonnie Docherty, ‘A ‘light for all humanity’: the treaty on the prohibition of nuclear weapons and the progress of humanitarian disarmament’ (2018) 30(2) *Global Change, Peace and Security* 163, 169.

<sup>208</sup> 2017 Treaty on the Prohibition of Nuclear Weapons.

<sup>209</sup> *Ibid* preamble.

<sup>210</sup> *Ibid* preamble.

obligation on State parties to “never under any circumstances”<sup>211</sup> use nuclear weapons, with additional prohibitions on the threat of use, development, testing, transferring, and essentially all elements associated with nuclear weapons use.

The lengthy process towards the prohibition of nuclear weapons progressed through stages of non-proliferation<sup>212</sup> and eventually, express prohibition.<sup>213</sup> The regulation of nuclear weapons has continued to highlight the centrality of the principle of humanity in the process towards prohibition. The 2017 Treaty serves as an important example for recommendations for the regulation of the use of weapons in Outer Space. It has entered into force despite neither of the Cold War nuclear weapons powers of the United States or Russia being parties to the instrument. This is illustrative of the fact that non-nuclear weapons States can have an impact on weapons regulation. In Outer Space, there are those States with Space-faring capabilities that are the current powerful States in Outer Space, in addition to the powerful private Space actors. However, humankind’s reliance on Outer Space for everyday functioning on Earth means that many States and humankind as a whole have interests in regulating the use of weapons in Outer Space. Thus, when forming recommendations for the regulation of the use of weapons in Outer Space, there can be impact from States without the power of space-faring capabilities.

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<sup>211</sup> 2017 Treaty on the Prohibition of Nuclear Weapons, art 1.

<sup>212</sup> 1968 Non-Proliferation Treaty.

<sup>213</sup> 2017 Treaty on the Prohibition of Nuclear Weapons.

#### **4.5.8 1976 Convention on the prohibition of military or any hostile use of environmental modification techniques (ENMOD Convention)<sup>214</sup>**

The ICRC notes that Article I of this convention “is part of disarmament efforts”<sup>215</sup> and it is outlined in the Preamble that the intention of States Parties in creating the convention was “[g]uided by the interest of consolidating peace, and wishing to contribute to the cause of halting the arms race, and of bringing about general and complete disarmament under strict and effective international control, and of saving mankind from the danger of using new means of warfare”.<sup>216</sup> Thus, the ENMOD Convention, while a prohibition, is highlighted from the outset as being an essential instrument in the process of disarmament with regard to environment modification weapons and techniques.

Article I of the ENMOD Convention outlines that States agree “not to engage in military or any other hostile use of environmental modification techniques having widespread, longlasting or severe effects as the means of destruction, damage or injury to any other State Party”,<sup>217</sup> as well as agreeing “not to assist, encourage or induce any State, group of States or international organization to engage in activities contrary to the provisions of paragraph 1 of this article.”<sup>218</sup> This is again illustrative of additional requirements alongside a prohibition to prevent use of ENMOD techniques by other States that align with an overall disarmament agenda.

The ENMOD Convention is also particularly relevant for this research as while being an instrument in the IHL framework, as Steer and Hersch highlight, it contains “somewhat

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<sup>214</sup> 1976 ENMOD Convention.

<sup>215</sup> ICRC International Humanitarian Law Database, ‘Convention on the prohibition of military or any hostile use of environmental modification techniques, 10 December 1976.’ <<https://ihl-databases.icrc.org/en/ihl-treaties/enmod-1976> > accessed 20 July 2023. See 1976 ENMOD Convention, preamble: “[d]etermined to continue negotiations with a view to achieving effective progress toward further measures in the field of disarmament”.

<sup>216</sup> 1976 ENMOD Convention, preamble.

<sup>217</sup> Ibid art I (1).

<sup>218</sup> Ibid art I (2).

uniquely, express recognition of the space environment”<sup>219</sup> in Article II.<sup>220</sup> In seeking to protect environments from the use of environmental modification techniques in a weaponised manner, the recognition of Outer Space as a potential domain which could be affected is illustrative of the continued recognition of Outer Space as a potential domain of weapons use, as well as being an environment that should be protected. This acknowledgement of Outer Space as a domain that should be protected from the consequences of weapons use is illustrative of the need to address the gap in the legal framework dealing with the regulation of the use of weapons in Outer Space as identified in this research.

#### **4.5.9 1997 Anti-Personnel Land Mines Treaty<sup>221</sup>**

Sassòli and Nagler define anti-personnel land mines as being “designed to explode by the presence, proximity or contact of a person in order to incapacitate, injure or kill that person.”<sup>222</sup> These weapons are dealt with to an extent in the previously-discussed Protocol II of the 1980 CCW, which bans certain anti-personnel land mines, as well as regulating the placement of others.<sup>223</sup> However, it is described that these provisions were not deemed to be sufficient, particularly for States whose aim was to “completely outlaw anti-personnel landmines”.<sup>224</sup> It was these States that negotiated the Anti-Personnel Land

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<sup>219</sup> Cassandra Steer and Dale Stephens, ‘International Humanitarian Law and Its Application in Outer Space’ in Cassandra Steer and Matthew Hersch (eds) *War and Peace in Outer Space: Law, Policy, and Ethics* (Oxford University Press 2021) 31.

<sup>220</sup> 1976 ENMOD Convention, art II: “[a]s used in article I, the term “environmental modification techniques” refers 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.”

<sup>221</sup> 1997 Anti-Personnel Mine Ban Convention.

<sup>222</sup> Marco Sassòli and Patrick S Nagler, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar Publishing 2019) 390.

<sup>223</sup> 1980 Protocol II to the 1980 Convention on Certain Conventional Weapons in which Art 3 deals with general restrictions, while articles 4, 5, 6 & 7 deal with restrictions on anti-personnel mines, anti-personnel mines that are not remotely delivered, remotely delivered mines and the prohibitions on booby-traps.

<sup>224</sup> Marco Sassòli and Patrick S Nagler, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar Publishing 2019) 391.

Mines Treaty (also often referred to as the Ottawa Convention)<sup>225</sup> which was introduced in 1997.

Article 1 of the Treaty outlines that “[e]ach State Party undertakes never under any circumstances: a) To use anti-personnel mines; b) To develop, produce, otherwise acquire, stockpile, retain or transfer to anyone, directly or indirectly, antipersonnel mines; c) To assist, encourage or induce, in any way, any one to engage in any activity prohibited to a State Party under this Convention.”<sup>226</sup> This is accompanied by an obligation upon States to destroy the land mines in their military arsenals.<sup>227</sup>

These provisions in the instrument illustrate a weapons prohibition that could eventually result in a complete disarmament, despite this treaty only being formed and agreed to by certain States that did not find Protocol II sufficiently extensive. However, it has much support, with it noted that “[a]nti-personnel landmines and cluster munitions are prohibited for most States, while their use is subject to particular regulations for other States.”<sup>228</sup> In addition, the Treaty has had an impact outside of its state parties as Sassòli and Nagler note that non-state parties “now use anti-personnel mines much more restrictively than before the Convention was adopted.”<sup>229</sup> This illustrates how between the regulation and prohibition approaches of both instruments, land mine use has been limited, even for, as noted, States that are party to neither instrument.

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<sup>225</sup> 1997 Anti-Personnel Mine Ban Convention.

<sup>226</sup> 1997 Anti-Personnel Mine Ban Convention, art 1(1).

<sup>227</sup> Ibid 1(2).

<sup>228</sup> Marco Sassòli & Patrick S Nagler, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar Publishing 2019) 387.

<sup>229</sup> Ibid 392.

#### 4.5.10 2008 Convention on Cluster Munitions<sup>230</sup>

As previously discussed in relation to the *Martić* case before the International Criminal Tribunal for the former-Yugoslavia,<sup>231</sup> cluster munitions are weapons which consist of “a large canister filled with many smaller submunitions”<sup>232</sup> which upon impact with the ground breaks open to disperse the smaller submissions in all and any direction. These weapons are expressly prohibited for the 111 ratifying States of the 2008 Convention on Cluster Munitions,<sup>233</sup> which requires that States undertake to “never under any circumstances to: (a) Use cluster munitions; (b) Develop, produce, otherwise acquire, stockpile, retain or transfer to anyone, directly or indirectly, cluster munitions; (c) Assist, encourage or induce anyone to engage in any activity prohibited to a State Party under this Convention.”<sup>234</sup> In addition, Article 3 of the Convention deals with the obligation to destroy cluster munitions in weapons stockpiles.<sup>235</sup> Cluster munitions are inherently indiscriminate in nature as the random dispersal of the bomblets upon contact with the ground does not facilitate distinction between combatants and civilians. Furthermore, all of these bomblets may not explode, which means that unnecessary suffering and superfluous injury can be caused to civilian populations after the end of the conflict. Cluster Munitions demonstrate why the principle of humanity is the appropriate lens for the formation of the recommendations for the regulation of weapons in Outer Space in this research as considerations of reduction of unnecessary suffering are seen to be central.

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<sup>230</sup> 2008 Convention on Cluster Munitions.

<sup>231</sup> *Prosecutor v Milan Martić* (Judgment) ICTY IT-95-11-T (12 June 2007).

<sup>232</sup> Karen Hulme, ‘The 2008 Cluster Munitions Convention: Stepping outside the CCW Framework (Again)’ (2009) 58(1) *The International and Comparative Law Quarterly* 219, 220.

<sup>233</sup> 2008 Convention on Cluster Munitions.

<sup>234</sup> *Ibid*, art 1.

<sup>235</sup> *Ibid* art 3: “1. Each State Party shall, in accordance with national regulations, separate all cluster munitions under its jurisdiction and control from munitions retained for operational use and mark them for the purpose of destruction. 2. Each State Party undertakes to destroy or ensure the destruction of all cluster munitions referred to in paragraph 1 of this Article as soon as possible but not later than eight years after the entry into force of this Convention for that State Party.”

All of the instruments discussed in this section seek to limit the amount of unnecessary suffering that occurs in armed conflicts by placing obligations on States with respect to limiting or prohibiting the use of these weapons. This section deals with instruments that serve as the foundation upon which this research forms its recommendations. In addition to these binding instruments, as Chapter 3 discusses, there has been an increase in the adoption of non-binding, soft law instruments in IHL. Particularly relevant soft-law instruments in relation to weapons regulation, and to the domain of Outer Space, are expert manuals that are discussed in the following section.

#### **4.6 Soft Law IHL and Weapons Regulation – Expert Manuals**

As Chapter 3 discusses, soft law instruments have a significant role in international legal frameworks, including that of IHL. However, the positive role that soft law can play in perhaps acting as the first step in the process towards creating a binding treaty does not seem to be wholly mirrored in the objectives of expert manuals. While non-binding in nature, and thus, technically constituting soft law, it is highlighted that in the case of expert manuals “[t]he agreed upon text does not constitute a draft treaty and is not intended to become binding as such on States. The aspiration is simply to make it easier for practitioners to reach informed decisions relating to armed conflict in compliance with the law in force”.<sup>236</sup>

The majority of expert manuals serve the legal role of summarising the *lex lata* with regards to a specific area. There already exists a rich body of IHL and often, emerging scenarios do not represent veritable ‘gaps’ in the framework that need to be addressed with the creation of a new legal instrument. Rather, what is required is a summary and

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<sup>236</sup> Yoram Dinstein, ‘Law of Armed Conflict Manuals’ in T.D. Gill et al. (eds) *Yearbook of International Humanitarian Law 2020* (Vol 23, Asser Press 2020) 5.

clarification of how existing IHL applies to emerging or new scenarios, including to new weapons technologies. An example of the provision of a summary of the *lex lata* on a particular IHL issue can be seen in the creation of expert manuals.

In 2020, Dinstein noted that “[f]or more than three decades, there has been a growing trend of setting up international groups of experts, sponsored by institutions or Governments, with a view to formulating restatements of the law of armed conflict (LOAC) in the form of non-binding manuals.”<sup>237</sup> The intended audience for the expert manuals created by these expert groups are “principally military legal officers and government officials.”<sup>238</sup> Nevertheless, as Chapter 3 mentions with regards to the role of soft law, the drafting of expert manuals can also serve to establish consensus on the interpretation of existing IHL with respect to modern issues and thus, can be insightful for a wider audience.

The role of expert manuals and the impact that they aim to have in the over-arching scheme of IHL may also link to the formation of customary international law, as discussed in Chapter 3,<sup>239</sup> but first and foremost, expert manuals have an independent role and have contributed to IHL for some time, as the examples examined in this section illustrate. The analysis of expert manuals is relevant for this research as there are two recent projects focusing on creating manuals summarising the application of existing IHL to military operations in Outer Space. These projects illustrate a turn towards soft law to clarify the law applicable to Outer Space, which is informative for this research’s recommendations

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<sup>237</sup> Ibid 4.

<sup>238</sup> Dale Stevens and Melissa de Zwart, ‘The Manual of International Law Applicable to Military Uses of Outer Space (MILAMOS)’ (August 1, 2017). RUMLAE Research Paper No. 17-12, U. of Adelaide Law Research Paper No. 2020-46 < <https://ssrn.com/abstract=3065704> > accessed 27 September 2023, 3.

<sup>239</sup> Yoram Dinstein, ‘Law of Armed Conflict Manuals’ in Terry D. Gill et al (eds), *Yearbook of International Humanitarian Law 2020* (Vol23, Asser Press TMC 2022) 5: “custom is the main focus of attention within the purview of LOAC due to a treaty-making paralysis currently affecting the inter-State body politic.”

for the regulation of the use of weapons in Outer Space and the form that this regulation is recommended to take.

#### **4.6.1 1880 Oxford Manual of the Laws of War and Land<sup>240</sup>**

The Oxford Manual was drafted by Gustave Moynier and was adopted by the Institute of International Law.<sup>241</sup> The Preamble of the Manual outlines that

“[t]he Institute, too, does not propose an international treaty, which might perhaps be premature or at least very difficult to obtain; but, being bound by its by-laws to work, among other things, for the observation of the laws of war, it believes it is fulfilling a duty in offering to the governments a ' Manual ' suitable as the basis for national legislation in each State, and in accord with both the progress of juridical science and the needs of civilized armies”,<sup>242</sup>

with reference to the Declaration of Brussels<sup>243</sup> that has preceded it. It is noted that despite the aim not to be a treaty, the Oxford Manual alongside the Brussels Declaration “formed the basis of the two Hague Conventions on land warfare and the Regulations annexed to them, adopted in 1899 and 1907.”<sup>244</sup> Thus, we see in the Oxford Manual, an example of a soft law expert manual that contributed to the original Hague Law instruments. This is illustrative of the role that soft law can have in creating a stepping-stone towards the creation of binding IHL instruments. This research suggests that this possible outcome

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<sup>240</sup> Institute of International Law ‘The Laws of War on Land. Oxford’ (adopted 9 September 1880) (1880 Oxford Manual of the Laws of War and Land).

<sup>241</sup> Cordula Droege and Eirini Giorgou, ‘How international humanitarian law develops’ (2022) 104(920-921) *International Review of the Red Cross* 1798, 1820-1821.

<sup>242</sup> 1880 Oxford Manual of the Laws of War and Land, preamble.

<sup>243</sup> Institute of International Law, ‘Project of an International Declaration concerning the Laws and Customs of War. Brussels’ (adopted 27 August 1874).

<sup>244</sup> ICRC International Humanitarian Law Database, ‘Project of an International Declaration concerning the Laws and Customs of War. Brussels, 27 August 1874’ <<https://ihl-databases.icrc.org/ihl/INTRO/135>> accessed 29 July 2022. See also Cordula Droege and Eirini Giorgou, ‘How international humanitarian law develops’ (2022) 104(920-921) *International Review of the Red Cross* 1798, 1821: “[t]hrough itself non-legally binding, the Oxford Manual made a significant contribution to the development of IHL, reflected in subsequent key instruments such as the Hague Conventions of 1899 and 1907, the Geneva Convention of 1929, the four Geneva Conventions of 1949, as well as the 1954 Hague Convention on the Protection of Cultural Property in Armed Conflict.”

from the creation of soft law is the reason the soft-law route is explored when binding law creates a stalemate.

#### **4.6.2 1994 San Remo Manual on International Law Applicable to Armed Conflicts at Sea<sup>245</sup>**

Steer outlines how “the San Remo International Institute of Humanitarian Law recognised the need to clarify how jus ad bellum and jus in bello applied to new technologies and new forms of warfare at sea,”<sup>246</sup> illustrating the focus of this expert manual on the means and methods of warfare.

Doswald-Beck highlights the fact that the IHL relating to the sea that was expressly included in IHL instruments “mostly dates back to 1907”,<sup>247</sup> and the San Remo Manual “helped clarify the present state of customary law and, in the case of controversial issues such as exclusion zones, proposes a legal regime that is as consistent as possible with both recent state practice and related areas of law.”<sup>248</sup> The value of the Manual was significant with it being “referred to by many States in the development of their own rules of engagement and national manuals...and has since contributed to further crystallisation of customary international law norms for conflict at sea.”<sup>249</sup> Furthermore, it is seen in the

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<sup>245</sup> International Institute of Humanitarian Law, ‘San Remo Manual on International Law Applicable to Armed Conflicts at Sea’ (adopted 12 June 1994).

<sup>246</sup> Cassandra Steer, ‘The Woomera Manual: Legitimising or Limiting Space Warfare?’ in Nikki Coleman and Stephen Coleman (eds), *Military Space Ethics* (forthcoming 2021 Howgate Publishing) ANU College of Law Research Paper No 21.5, <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3802195](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3802195) > accessed 28 September 2023, 15.

<sup>247</sup> Louise Doswald-Beck, ‘The San Remo Manual on International Law Applicable to Armed Conflicts at Sea’ (1995) 89(1) *The American Journal of International Law* 192, 193. It is noted in Steven Haines, ‘War at sea: Nineteenth-century laws for twenty-first century wars?’ (2016) 98(2) *International Review of the Red Cross* 419, 434 that “[s]ince 1936, there has been no substantial conventional development of the law, despite naval power having changed in important respects.”

<sup>248</sup> *Ibid.*

<sup>249</sup> Cassandra Steer, ‘The Woomera Manual: Legitimising or Limiting Space Warfare?’ in Nikki Coleman and Stephen Coleman (eds), *Military Space Ethics* (forthcoming 2021 Howgate Publishing) ANU College of Law Research Paper No 21.5, <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3802195](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3802195) > accessed 28 September 2023, 15.

development of further expert manuals that “subsequent LOAC manuals have emulated the San Remo format.”<sup>250</sup>

#### **4.6.3 2013 Harvard Humanitarian Policy and Conflict Research (HPCR) Manual on International Law Applicable to Air and Missile Warfare**<sup>251</sup>

Another expert manual is that of the HPCR manual, focusing on the air and missile warfare. As was the case with the previously-discussed manuals, the soft-law instrument does not seek to gain binding force but rather, “hopefully it will serve as a valuable resource for armed forces in the development of rules of engagement, the writing of domestic military manuals, the preparation of training courses, and – above all – the actual conduct of armed forces in combat operations.”<sup>252</sup>

An important element of the HPCR manual is its focus on *jus in bello*,<sup>253</sup> which, as is discussed in this section with regards to space law manuals, is not always the case. Furthermore, while “the original (2006) draft HPCR Manual dealt with issues of military operations in outer space, it was agreed to delete these Black-letter Rules from the text, in response to the vigorous recommendation of most government representatives”.<sup>254</sup> As this section outlines military operations in Outer Space have become the subject of expert manuals in recent times.

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<sup>250</sup> Yoram Dinstein, ‘Law of Armed Conflict Manuals’ in Terry D. Gill et al (eds) *Yearbook of International Humanitarian Law 2020* (Vol 23, Asser Press 2022) 14.

<sup>251</sup> The Program on Humanitarian Policy and Conflict Research at Harvard University, *Harvard Humanitarian Policy and Conflict Research (HPCR) Manual on International Law Applicable to Air and Missile Warfare* (Cambridge University Press 2013).

<sup>252</sup> *Ibid* xiii.

<sup>253</sup> *Ibid* xvi: “[f]rom the very inception of the project, it was understood that the HPCR Manual is designed for operational use in the conduct of hostilities (*jus in bello*)”.

<sup>254</sup> *Ibid* xvi..

#### 4.6.4 2013 Tallinn Manual<sup>255</sup> and 2017 Tallinn Manual 2.0<sup>256</sup>

The Tallinn Manual on the International Law Applicable to Cyber Warfare, originally published in 2013,<sup>257</sup> updated in 2017<sup>258</sup> and currently taking recommendations for a further update,<sup>259</sup> addresses the intersection of cyber law and IHL. Schmitt outlines the role of the Tallinn Manual as “not an official document but is only the product of a group of independent experts acting solely in their personal capacity.”<sup>260</sup> The highlighting of the independence of the experts who contributed to the manual’s content is important as it faced criticisms that it “was funded largely by the NATO Cooperative Cyber Defence Centre of Experts”.<sup>261</sup> However, Schmitt notes that the Manual “is not meant to reflect NATO doctrine.”<sup>262</sup> Thus, the Tallinn Manual is independent of NATO’s policies with regards to military operations in the cyber domain, which constitutes one of NATO’s ‘operational domains’ alongside Outer Space.<sup>263</sup>

While not dealing with kinetic weapons regulation, as is the focus of this research, “[m]ost of the Tallinn Rules focus, however, on the interplay between cyberoperations and the

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<sup>255</sup> International Group of Experts at the Invitation of the NATO Cooperative Cyber Defence Centre of Excellence, *Tallinn Manual on the International Law Applicable to Cyber Warfare* (Cambridge University Press 2013) (Tallinn Manual).

<sup>256</sup> International Group of Experts at the Invitation of the NATO Cooperative Cyber Defence Centre of Excellence, *Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations* (Cambridge University Press 2017) (Tallinn Manual 2.0).

<sup>257</sup> Tallinn Manual.

<sup>258</sup> Tallinn Manual 2.0.

<sup>259</sup> CCDCOE, ‘The CCDCOE Invites Experts to Contribute to the Tallinn Manual 3.0’ <<https://ccdcoe.org/news/2021/the-ccdcoe-invites-experts-to-contribute-to-the-tallinn-manual-3-0/>> accessed 12 May 2023.

<sup>260</sup> Michael N Schmitt, ‘Introduction’ in International Group of Experts at the Invitation of the NATO Cooperative Cyber Defence Centre of Excellence, *Tallinn Manual on the International Law Applicable to Cyber Warfare* (Cambridge University Press 2013) 11.

<sup>261</sup> Cassandra Steer, ‘The Woomera Manual: Legitimising or Limiting Space Warfare?’ in Nikki Coleman and Stephen Coleman (eds), *Military Space Ethics* (forthcoming 2021 Howgate Publishing) ANU College of Law Research Paper No 21.5, <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3802195](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3802195) > accessed 28 September 2023, 16.

<sup>262</sup> Michael N Schmitt, ‘Introduction’ in International Group of Experts at the Invitation of the NATO Cooperative Cyber Defence Centre of Excellence, *Tallinn Manual on the International Law Applicable to Cyber Warfare* (Cambridge University Press 2013) 11.

<sup>263</sup> NATO, ‘NATO’s Approach to Space’ (23 May 2023) <[https://www.nato.int/cps/en/natohq/topics\\_175419.htm](https://www.nato.int/cps/en/natohq/topics_175419.htm)> accessed 1 September 2023.

use of force<sup>264</sup> and contribute to IHL in a new arena for warfare. While cyber military operations are not the focus of this research, as Chapter 6 discusses, the waging of attacks against another State in Outer Space could be carried out using cyber warfare techniques. In this sense, the Tallinn Manual may serve to inform future IHL regulation for the domain of Outer Space, outside of the recommendations that this research forms which focus on kinetic weapons that can operate in Outer Space.

#### **4.6.5 2020 Oslo Manual on Select Problems of the Law of Armed Conflict<sup>265</sup>**

It is noted that “[t]he Oslo Manual uses both the HPCR Manual and the 1994 San Remo Manual on International Law Applicable to Armed Conflicts at Sea as models.”<sup>266</sup> The aim of the Oslo Manual was to serve as an update for the previously-discussed HPCR manual.<sup>267</sup> The manual deals with IHL issues such as Outer Space,<sup>268</sup> Cyber Operations,<sup>269</sup> Remote and Autonomous Weapons,<sup>270</sup> among others. Soft-law manuals specific to some of these issues already exist, such as the previously discussed Tallinn Manual<sup>271</sup> with regards to cyber operations or the projects for soft-law manuals on Outer Space discussed in the following sub-sections. However, the Oslo Manual provides a summary of the *lex lata* with respect to many select issues, as far-ranging as International Criminal Law,<sup>272</sup> and how these issues are dealt with in existing IHL.

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<sup>264</sup> Dan Efrony and Yuval Shany, ‘A Rule Book on the Shelf? Tallinn Manual 2.0 on Cyberoperations and Subsequent State Practice’ (2018) 112(4) *The American Journal of International Law* 583, 584.

<sup>265</sup> Yoram Dinstein and Arne Willy Dahl, *Oslo Manual on Select Topics of the Law of Armed Conflict – Rules and Commentary* (Springer Open 2020).

<sup>266</sup> *Ibid* vi.

<sup>267</sup> *Ibid* v: “[a]fter sixteen courses, the AMPLE team of instructors summarized their experiences and concluded that the HPCR Manual was in need of updating”.

<sup>268</sup> *Ibid* section I.

<sup>269</sup> *Ibid* section II.

<sup>270</sup> *Ibid* section III.

<sup>271</sup> Tallinn Manual.

<sup>272</sup> Yoram Dinstein and Arne Willy Dahl, *Oslo Manual on Select Topics of the Law of Armed Conflict – Rules and Commentary* (Springer Open 2020) section XVII.

As this research focuses on the regulation of the use of weapons in Outer Space, the summary of the *lex lata* on the specific issue of Outer Space in the Oslo Manual is of relevance. The prohibition outlined in Article IV of the 1967 of the Outer Space Treaty with regards to the placement of nuclear weapons and weapons of mass destruction in Outer Space, as well as the testing and stationing of weapons of any kind on celestial bodies is referenced in Rule 3.<sup>273</sup> The weapons review provided for in Art 36 of 1977 Additional Protocol I<sup>274</sup> is also outlined in Rule 7 as applying to weapons that can be used in armed conflict in Outer Space.<sup>275</sup> Rule 11 of the Outer Space section of the Oslo Manual addresses a consideration that highlights the unique nature of the Outer Space environment and that is that consequences of an attack with regards to space debris should be considered.<sup>276</sup> As Chapter 6 notes, Outer Space is a unique domain and the use of weapons in its environment requires unique consideration. The fact that the Oslo Manual addresses weapons use in Outer Space shows how this issue, similarly the focus of this research, is a growing concern. Despite the Oslo Manual laying the foundation with regards to recognising the possibility of weapons use in Outer Space, the Space-specific expert manuals that followed did not follow the same example.

#### **4.6.6 2022 McGill Manual<sup>277</sup> and Woomera Manual<sup>278</sup>**

The McGill Manual on International Law Applicable to Military Uses of Outer Space was a project, also known as the MILAMOS project, undertaken to form an expert manual

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<sup>273</sup> Ibid section I, rule 3.

<sup>274</sup> 1977 Additional Protocol I, art 36.

<sup>275</sup> Yoram Dinstein and Arne Willy Dahl, *Oslo Manual on Select Topics of the Law of Armed Conflict – Rules and Commentary* (Springer Open 2020) section I, rule 7.

<sup>276</sup> Ibid section I, rule 11.

<sup>277</sup> Ram S Jaku & Steven Freeland (eds), *McGill Manual on International Law Applicable to Military Uses of Outer Space: Volume I – Rules* (McGill 2022).

<sup>278</sup> The University of Adelaide, ‘The Woomera Manual’ <<https://law.adelaide.edu.au/woomera/>> accessed 24 August 2023.

dealing with the military uses of Outer Space. Volume I of the Manual, which deals with the rules, was published in 2022. The aim of the McGill Manual was to address the international law applicable to the increasing range of issues that are arising in Outer Space, with the military uses of this domain being one such issue.<sup>279</sup>

As is the case with the other expert manual discussed, the McGill manual outlines that it “only identifies and clarifies the applicable *lex lata*, or the law as it is, governing space activities, including military uses of outer space.”<sup>280</sup> However, in terms of offering relevant information for the purpose of this research and the forming of recommendations regarding the use of weapons in Outer Space, it is specifically clarified that “[t]he rules of international humanitarian law that apply only when an armed conflict exists are not relevant to the specific focus of the McGill Manual.”<sup>281</sup> Therefore, with the exception of IHL from the rules of the McGill Manual and the focus on summarising the law as it already exists and how it applies to Outer Space, Volume I does not provide a lot of new or relevant insights for the purpose of this research. Nevertheless, when McGill Manual: Volume II - Rules with Commentaries, which has yet to be published, is released, it could add much to the militarisation and weaponisation of Outer Space debate, while still excluding IHL. While the McGill Manual does not deal with IHL, which is a central focus of this research on weapons regulation, the McGill Manual is relevant as it illustrates a move towards soft law instruments to address military uses of Outer Space. This approach being adopted to deal with the militarisation of Outer Space informs the recommendations that this research forms for regulation in terms of the form of regulation that is suggested.

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<sup>279</sup> Ram S Jaku and Steven Freeland (eds), *McGill Manual on International Law Applicable to Military Uses of Outer Space: Volume I – Rules* (McGill 2022) 2: “[t]he McGill Manual is the first international collaborative and dedicated endeavour to determine and clarify the rules of international law applicable to a range of issues that have a bearing on space activities, including military space activities.”

<sup>280</sup> *Ibid* 4.

<sup>281</sup> *Ibid*.

The McGill Manual is also not the only soft law instrument addressing the militarisation of Outer Space. An additional on-going expert manual project regarding the military uses of Outer Space is the Woomera Manual on the International Law of Military Space Activities and Space Operations.<sup>282</sup> The project is being led by a collaborative team from The University of Adelaide, The University of Exeter, the University of Nebraska and the University of New South Wales. While not published as of yet, this expert manual does seek to “help clarify the application of the law governing resort to force and law of armed conflict to new domains and means and methods of armed conflict”,<sup>283</sup> illustrating that IHL is considered in this project.

As this section’s analysis illustrates, there is a growing preference for soft law in many instances with regards to continuing the development of IHL, with soft-law expert manuals being one of the iterations of such non-binding efforts, particularly in response to developments in means and methods of warfare. As outlined, developments in the militarisation of Outer Space are addressed in some expert manual projects. This contributes to the understanding of the current approach being taken to addressing the gap at the intersection of the IHL and ISL frameworks with regards to weapons use in Outer Space. This is informative for the formation of recommendations with regards to the form that the regulation of the use of weapons in Outer Space should adopt. The different approaches adopted towards weapons regulation are discussed in the following section.

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<sup>282</sup> The University of Adelaide, ‘The Woomera Manual’ < <https://law.adelaide.edu.au/woomera/> > accessed 24 August 2023.

<sup>283</sup> The University of Adelaide, ‘The Woomera Manual: Legal Framework and Context’ <<https://law.adelaide.edu.au/woomera/legal-framework> > accessed 24 August 2023.

#### 4.7 Why Weapons are Regulated in Certain Ways

This chapter outlines the landscape of the regulation of the means and methods of warfare in IHL, from previous weapons regulation instruments to perhaps the future of weapons regulation attempts in the form of soft-law expert manuals. In this chapter's analysis, it is evident that with regards to certain weapons, such as biological<sup>284</sup> and chemical<sup>285</sup> weapons and environmental modification techniques,<sup>286</sup> the prohibitions of these means and methods of warfare are also combined with additional requirements, such as not developing these weapons, not inciting use by other States, destruction of stockpiles or not transferring to other States. In these instances, the prohibition can be seen to be part of a larger plan of disarmament. This means that the focus is not only on prohibiting the weapons' use during armed conflict because their use is inherently contrary to IHL, but also on eliminating the presence in States military arsenals. In the ideal application of such disarmament, the weapon would no longer pose a threat, because the weapon would no longer exist for any States to use.

As is illustrated in Chapter 6, attempts at prohibition of weapons in Outer Space have not progressed, partly due to the introduction of the proposal to prohibit the placement of weapons in Outer Space by China and Russia, but also due to States different Outer Space agendas. As noted in the discussion of the theories of regulation and that of the process towards the regulation of nuclear weapons, powerful States will agree to legal arrangements that consolidate their position of power. IHL, like any branch of international law, does not exist in a vacuum and the political interests of the key States will often determine whether progress will be made in relation to the formation of a legal instrument or not.

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<sup>284</sup> 1972 Biological Weapons Convention.

<sup>285</sup> 1993 Chemical Weapons Convention.

<sup>286</sup> 1976 ENMOD Convention.

However, the 2017 Treaty on the Prohibition of Nuclear Weapons, the “first globally applicable multilateral agreement to comprehensively prohibit nuclear weapons”,<sup>287</sup> saw an instrument enter into force seeking to prohibit the use of nuclear weapons without the ratifications of the United States or Russia, two of the known nuclear power States. The majority of States parties to the Treaty are non-nuclear States, but their ratifications facilitated the Treaty to enter into force. This research asserts that this is not an entirely different situation to that of Outer Space, where there are certain powerful States that have space-faring capabilities and divergent military agendas, and then numerous smaller States that also require uninterrupted and peaceful access to satellite-provided information that would not be possible if hostilities broke out in Outer Space.

With a significant lack of consensus among Outer Space actors, as discussed in Chapters 5 and 6, and the stalemate of an existing prohibition proposal, this research will focus on proposing weapons regulation/limitation as opposed to seeking to prohibit weapons in Outer Space altogether. As noted, the entering into force of the 2017 Treaty on the Prohibition of Nuclear Weapons<sup>288</sup> serves as evidence that the larger space-faring States need not necessarily support a weapons regulation instrument in order for it to come into existence. With regards to the trend of soft-law IHL instruments, as noted there are projects already in existence which seek to address and summarise the existing situation of the militarised environment of Outer Space. Thus, this research will not be focusing on additional soft-law IHL proposals in its recommendations.

Overall, while States’ interests and politics may influence the approaches adopted when forming an IHL instrument to address means and methods of warfare, this research illustrates that the underlying reason for the introduction of all of the instruments

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<sup>287</sup> ICRC, ‘Treaty on the Prohibition of Nuclear Weapons’ (18 January 2021) <<https://www.icrc.org/en/document/2017-treaty-prohibition-nuclear-weapons>> accessed 24 August 2023.

<sup>288</sup> 2017 Treaty on the Prohibition of Nuclear Weapons.

discussed in this chapter is the reduction of unnecessary suffering and superfluous injury – essentially, the principle of humanity as defined by this research. The principle of humanity is the driving force behind the development and formation of all weapons regulation, whether in binding or non-binding form, and regardless of the way in which weapons are regulated, the main reason is to achieve the aim of the principle of humanity. This is why the recommendations of this research are formed from the perspective of the principle of humanity.

#### **4.8 Conclusion**

This chapter has provided the context of weapons regulation in IHL with regards to the theories of regulation, with Section 4.1 discussing general theories of regulation and Section 4.2 addressing theories of weapons regulation. The need for specific weapons regulation is outlined in Section 4.3 and Section 4.4 examines the different forms of weapons regulation. This contextual analysis of the approaches to weapons regulation informs the recommendations that this research forms for the regulation of the use of weapons in Outer Space. In addition, Section 4.4 addresses the claim that deterrence is an effective means of weapons regulation with regards to Outer Space as fear of mutual destruction prevents States from using weapons in Outer Space. This research concludes that weapons tests have been seen in Outer Space, as Chapter 6 discusses, which is illustrative of a lack of fear and even if Space actor States were deterred, Section 4.4 concluded that deterrence should be accompanied by an instrument of weapons regulation. Section 4.5 analysed weapons regulation instruments within the IHL framework, illustrating the different approaches towards regulating weapons identified in these instruments. The approaches towards weapons prohibition or limitation predominantly focus on the characteristic of a weapon, which, as discussed in relation to

1899 Hague Convention (IV, 3)<sup>289</sup> in relation to the prohibition of dum dum bullets, often results in an inflexible prohibition that can be circumvented with technological alterations to weapons. This analysis contributes to the recommendations for the regulation of the use of weapons in Outer Space formed by this research. Section 4.6 outlines the non-binding expert manuals, the soft-law instruments that are increasingly being introduced in IHL to address new issues that arise, including Outer Space as two projects illustrate. Finally, Section 4.7 outlines why weapons are regulated in certain ways, including the impact of political and strategic considerations on this regulation.

The analysis of the approaches to the regulation of weapons in the past illustrates that characteristics of weapons are often the focus of regulation. This research submits that this approach would not be successful in addressing the gap in the legal frameworks that deal with the regulation of the use of weapons in Outer Space as not all weapons that can be used in Outer Space possess the same characteristics. Thus, the result would be another gap in the relevant legal framework. Furthermore, as Section 4.7 discusses, drawing on the information from the theories of weapons regulation outlined in Section 4.2, States engagement with weapons regulation instruments is often determined by their own political and strategic interests. As this research discusses in Chapter 5, with regards to attempts at weapons regulation in Outer Space, some such attempts have failed due to States' own interests.

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<sup>289</sup> 1899 Hague Convention (IV, 3).

## Chapter 5: Existing Legal Framework for Outer Space

### 5.0 Introduction

“[T]he great prospects opening up before mankind as a result of man’s entry into outer space”<sup>1</sup> served as the background for the introduction of the existing legal framework for Outer Space, as emphasised in the preamble of the 1967 Outer Space Treaty. While man’s entry into Outer Space presented great prospects, it also signalled the entry into an unforeseen territory and humankind’s actions required regulation to ensure the responsible use and exploration of this territory.

The ‘Space Race’ of the 1950s and 60s between the ‘Space Powers’ of the time, the United States and the then USSR, was the context in which the ISL framework emerged.<sup>2</sup> The era saw the launch of first satellite,<sup>3</sup> the first man in Space<sup>4</sup> and the first men to walk on the moon.<sup>5</sup> However, as de Zwart notes “a time of great national pride and wonder at the technological achievements of humankind...was also, however, a time of great tension and fear when the global threat that would potentially be posed by the weaponization of outer space was first appreciated.”<sup>6</sup> It was in this period, when the advances made by either State “inextricably related to military strength”<sup>7</sup> and the possibility of a conflict was constantly looming, that the ISL framework was formed.

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<sup>1</sup> 1967 Outer Space Treaty, preamble.

<sup>2</sup> See Colin Burgess, *The Greatest Adventure: A History of Human Space Exploration* (Reaktion Books 2021) 56 where Yuri Gagarin’s triumph of being the first man in Outer Space was described as “an impressive first-up victory for the Soviet Union in the superpower space race”, using the terminology describing the actors and activity of the time.

<sup>3</sup> Caroline P Lubert, ‘From Sputnik to SpaceX: 60 Years of Rocket Launch Acoustics’ (2018) 14(4) *Acoustics Today* 38: “[a]t 7.28 pm (GMT) on October 4, 1957, the Soviet Union launched a 58-cm-diameter polished metal sphere into an elliptical Earth orbit at 29,000 kilometers per hour (kph), 800 km above the Earth’s surface.”

<sup>4</sup> Colin Burgess, *The Greatest Adventure: A History of Human Space Exploration* (Reaktion Books 2021) 56.

<sup>5</sup> *Ibid* 190.

<sup>6</sup> Melissa de Zwart, ‘Outer Space’ in William H. Boothby (ed) *New Technologies and the Law in War and Peace* (Cambridge University Press 2019) 339-340.

<sup>7</sup> Steven Freeland, ‘Peaceful Purposes – Governing the Military Uses of Outer Space’ (2016) 18(1) *European Journal of Law Reform* 35, 36.

This chapter investigates the ISL framework and provides an analysis of both its core concepts and shortcomings. Section 5.1 outlines the laws that apply to Outer Space, including those at a domestic and regional level, as well as agreements often utilised in practice with regards to Outer Space activities such as memorandums of understanding and bi-lateral agreements. Memorandums of understanding are agreements for which “[a]s a matter of law there is no generally agreed definition”,<sup>8</sup> but as Murthy outlines, essentially constitutes “an agreement between two (or more) parties.”<sup>9</sup> The agreement is based upon setting out the objectives that the parties are agreeing to achieve<sup>10</sup> and it can in some circumstances lay the foundation for a contract.<sup>11</sup> Not entirely dissimilar, bi-lateral agreements are agreements made between only two parties focusing on their aims and obligations. Bi-lateral agreements are most well-known in space law because of their use with respect to States agreeing to the Artemis Accords.<sup>12</sup> Section 5.2 outlines the UN GA declarations, some of which laid the foundations for the binding treaties in the ISL framework. These declarations, while non-binding, address different issues that arose with respect to Outer Space up until the mid-1990s. Section 5.3 analyses the five binding instruments that form the ISL framework. Establishing the understanding of this framework contributes to the answering of research sub-question two of this thesis, as the ISL framework alongside the IHL frameworks regulates the use of weapons in Outer Space. Following on from this, Section 5.4 investigates the specific provisions in the ISL framework which apply to the issue of weapons use and regulation in Outer Space. This analysis informs the recommendations formed by this research as the challenges faced by

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<sup>8</sup> Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2020) 33.

<sup>9</sup> K.R.S Murthy, ‘MOU: More Memorandum than Understanding’ (1990) 25(21) *Economic and Political Weekly* M-59.

<sup>10</sup> *Ibid*: “to set out the mutual obligations and expectations”.

<sup>11</sup> Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2020) 33: “[i]t may, but need not, precede a contract”.

<sup>12</sup> Melissa de Zwart, ‘To the Moon and Beyond: The Artemis Accords and the Evolution of Space Law’ in Melissa de Zwart and Stacey Henderson (eds) *Commercial and Military Uses of Outer Space* (Springer 2021) 69: “[t]he approach of the Artemis Accords, using bilateral agreements to determine the rules of the joint venture”.

existing regulation attempts are identified. Section 5.5 then addresses the customary international law which applies to Outer Space and Section 5.6 provides an overview of the gaps in the existing space law framework. A clear illustration of the existing ISL framework is important for this research as it outlines the framework in which recommendations for the regulations of weapons use in Outer Space, outlined in Chapter 7, seek to be interwoven, with recommendations seeking to take both IHL and ISL into consideration.

## **5.1 Laws Applicable to Outer Space**

Outer Space, the space above air space, has been difficult to define by its limits and it is noted that “no answer has been provided to the basic question of where air space ends and outer space begins.”<sup>13</sup> Outer Space, as a domain, is generally recognised as being beyond the atmosphere<sup>14</sup> or beyond the Kármán line,<sup>15</sup> to mention a few examples of how it is understood from a general perspective. From a legal perspective, Outer Space cannot be viewed merely as a vast expanse of emptiness to which no laws or regulations apply. Rather, as Collins explains, “it is crucial to understand Outer Space and atmospheric airspace as forms of territory, rather than as vacuums above the ‘real’ territories of the Earth’s surface”.<sup>16</sup> Therefore, States’ actions in Outer Space, including on the Moon and other Celestial Bodies, are necessarily subject to regulation under international law, as well as domestic and regional law, because actions that occur in Outer Space can have

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<sup>13</sup> Stanley B Rosenfield, ‘Where Air Space Ends and Outer Space Begins’ (1979) 7(2) *Journal of Space Law* 137.

<sup>14</sup> *Ibid* 138; “Space has been defined as the point of the universe lying outside the limits of the earth’s atmosphere.”

<sup>15</sup> Daisy Dobrijevic and Andrew May, ‘The Kármán Line: Where does space begin?’ (Space.com, 14 November 2022) < <https://www.space.com/karman-line-where-does-space-begin> > accessed 17 September 2023.

<sup>16</sup> Christy Collins, ‘Territories beyond possession? Antarctica and Outer Space’ (2017) 7(2) *The Polar Journal* 287, 295.

significant consequences for Earth and its population, as well as the celestial system as whole. As Chapter 1 outlines, the actions that occur in Outer Space can impact Earth and humankind as a whole, particularly due to the nature of Outer Space. It is an environment commonly referred to as “congested, competitive and contested”.<sup>17</sup> There are a large number of satellites in-orbit, as well as much Space debris alongside activities on-going such as the Artemis Mission and the prospect of Space tourism provided by private Space actors. Regulation is required to ensure the continued functioning of this environment that is essential to day-to-day functioning on-Earth.<sup>18</sup>

### 5.1.1 What laws apply to Outer Space?

While the focus of this research is that of ISL, it is important to recognise that Outer Space activities are not guided only by the framework spear-headed by the United Nations. Rather, domestic legislation has been introduced by States to address Space activities. In addition to domestic Space strategies that States’ governments introduce as a statement of the intents and objectives of their State with regards to Outer Space,<sup>19</sup> domestic laws are introduced to align with the international standards set by ISL. For example, the *France Space Operations Act*<sup>20</sup> regulates the licensing and insurance of France’s space objects, while in the *Space (Launches and Returns) Act 2018*<sup>21</sup> in Australia regulates launch and return activities being carried out in Australia or by Australian citizens.

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<sup>17</sup> Roger G Harrison, ‘Unpacking the Three C’s: Congested, Competitive, and Contested Space’ (2013) 11 *Astropolitics* 123.

<sup>18</sup> Melissa de Zwart, ‘Outer Space’ in William H Boothby (ed) *New Technologies and the Law in War and Peace* (Cambridge University Press 2019) 337: “nobody contemplated that space would within a relatively short time become vital to communication, navigation and virtually every other service on Earth.”

<sup>19</sup> For example, the United Kingdom have HM Government, ‘National Space Strategy’ (September 2021) <[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1034313/national-space-strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1034313/national-space-strategy.pdf)> accessed 13 September 2021.

<sup>20</sup> *Space Operations Act (LOI n° 2008518 du 3 juin 2008 relative aux opérations spatiales)* (France).

<sup>21</sup> *Space (Launches and Returns) Act 2018* (Australia).

The following sections discuss law and law-making relevant to Outer Space at domestic and regional level prior to the discussion of the ISL framework in Section 5.2, 5.3 and 5.4. Outlining the domestic and regional space law context is important as these areas also contribute to the general understanding of space law, which informs the recommendations that this research forms for an instrument regulating the use of weapons in Outer Space, even if these recommendations are formed through the lens of the principle of humanity in IHL. With regards to the regulation of weapons use in Outer Space, the gap currently exists at the intersection of the IHL and ISL frameworks and previous weapons regulation instruments are evident in both frameworks, as is discussed in Chapter 4 and this chapter. The recommendations that this research forms must be informed by analysis of both IHL and ISL and an understanding of all of the domestic and regional legal regimes that regulate Outer Space activities, in addition to the ISL framework, is important context for this research outlined in this section.

#### **5.1.1.1 Domestic Law**

As Lyall and Larsen note and as referred to above, numerous States have developed domestic space law instruments, “particularly those of states that are space-active”,<sup>22</sup> with the Space Powers implementing domestic space law that pre-dated the ISL framework. The United States introduced the *National Aeronautics and Space Act* of 1958,<sup>23</sup> which established their national Space agency of NASA and outlined the structure under which space activities would be developed and carried out. NASA’s role is to be the

“civilian agency exercising control over aeronautical and space activities sponsored by the United States, except that activities peculiar to or primarily associated with the development of weapons systems, military operations, or the defense of the United States (including the research and development necessary

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<sup>22</sup> Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2018) 28.

<sup>23</sup> "National Aeronautics and Space Act of 1958," Public Law #85-568, 72 Stat., 426. Signed by the President on July 29, 1958 (United States).

to make effective provision for the defense of the United States) shall be the responsibility of, and shall be directed by, the Department of Defense”.<sup>24</sup>

Following the introduction of the ISL framework by the United Nations from 1967-1979, States continued to enact domestic space law, often focusing on Outer Space issues that were of interest or concern to the State or that were relevant to their space activities. This is seen, for example, with Luxembourg introducing the *Law of July 20<sup>th</sup>, 2017, on the Exploration and Use of Space Resources*,<sup>25</sup> making it the first European State and second State globally, to introduce domestic legislation on the use of Outer Space resources. While less active States with respect to space activities and non-space faring States like Ireland have not yet reached the stage of implementing binding domestic law with regards to Space activities, the number of Ireland-based companies that are involved in Outer Space industry has resulted in the Government of Ireland’s Department of Business, Enterprise and Innovation adopting a National Space Strategy for Enterprise 2019-2025.<sup>26</sup> This strategy recognises the existing engagement of Irish companies in the Space industry and outlines goals for the Government to achieve with regards to supporting and expanding upon this engagement, as well as increasing public understanding of Ireland’s role in the Space industry.<sup>27</sup> This trend of the adoption of domestic space law was recognised by the UN GA which in 2013 provided recommendations on the creation of national legislation regarding the peaceful exploration and use of Outer Space in Res 68/74 “in the view of increasing participation of non-governmental entities in space activities, appropriate action at the national level is needed”.<sup>28</sup>

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<sup>24</sup> Ibid s 102(b).

<sup>25</sup> *Law of July 20<sup>th</sup>, 2017, on the Exploration and Use of Space Resources* (Luxembourg).

<sup>26</sup> Government of Ireland, ‘National Space Strategy for Enterprise 2019-2025’ <<https://enterprise.gov.ie/en/publications/publication-files/national-space-strategy-for-enterprise-2019-2025.pdf>> accessed 19 August 2023.

<sup>27</sup> Ibid 7.

<sup>28</sup> United Nations General Assembly, ‘Recommendations on national legislation relevant to the peaceful exploration and use of outer space’ (11 December 2013) A/RES/68/74, preamble.

The formation of domestic space law has increased. The reasons behind a State introducing domestic space law can include establishing institutions at a domestic level to deal with Outer Space, applying domestic law to “materiél”, or integrating ISL into domestic law.<sup>29</sup> Furthermore, as Outer Space activities involve more private actors, there is an increasing need for domestic space law. For example, in the United States *Title 47: Telecommunications of the Code of Federal Regulations*<sup>30</sup> regulates the satellite activities of SpaceX. Since in ISL it is the United States that bears responsibility for SpaceX’s activities under Article VI of the 1967 Outer Space Treaty,<sup>31</sup> it is important that SpaceX is regulated domestically.

In addition to dealing with space law at a domestic level, States may become a member of a regional space agency, such as ESA. This may involve the adoption of or adherence with agency regulations for member states. In addition, at a regional level there may be for a for the collaborative discussion on Outer Space activities by relative States and in Europe, the European Union could see the introduction of a space policy. These different regional activities and institutions also contribute to space law for States, while not necessarily at the ISL level. They nevertheless shape the landscape of space law and understanding of the existing state of space law informs the recommendations that this research makes for an instrument regulating the use of weapons in Outer Space.

### **5.1.1.2 Regional Law**

The most widely-known regional space agency is the European Space Agency (ESA).<sup>32</sup>

In terms of other regional space agencies, there were proposals and discussions for an

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<sup>29</sup> Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2018) 29.

<sup>30</sup> Code of Federal Regulations. 2022. Title 47: Telecommunication, <<https://www.ecfr.gov/current/title-47/chapter-I>> accessed 19 September 2023.

<sup>31</sup> 1967 Outer Space Treaty, art VI.

<sup>32</sup> The European Space Agency <<https://www.esa.int/>> accessed 19 August 2023.

African Space Agency in the 2000s. For example, in 2008, Gottschalk discussed the “case for continental coordination”<sup>33</sup> with regards to institutions relevant to Outer Space through the establishment of an African Space Agency. Such coordination successfully arose in 2018, when the States of the African Union adopted the Statute of the African Space Agency. Article 4 outlines the aim of the agency “to conduct activities that exploit space technologies and applications for sustainable development and improvement of the welfare of African citizens.”<sup>34</sup> In January 2023, the African Space Agency began operating.<sup>35</sup>

Regional space forums also exist, such as the Asia-Pacific Regional Space Agency Forum (APRSAF),<sup>36</sup> established in 1993. Members of the APRSAF include 544 organisations which are based in 52 different countries or regionals, as well as 32 international organisations,<sup>37</sup> which includes the United Nations Office on Outer Space Affairs (UNOOSA) and the United Nations Committee for the Peaceful Uses of Outer Space (UNCOPUOS), ESA and the ASEAN Secretariat;<sup>38</sup> as well as “private companies, universities, and research institutes”.<sup>39</sup> The aim of APRSAF, as outlined in the forum’s principles, is to promote the use of Outer Space in a way that benefits the Asia-Pacific

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<sup>33</sup> Keith Gottschalk, ‘The Roles of Africa’s Institutions in Ensuring Africa’s Active Participation in the Space Enterprise: The Case for an African Space Agency’ (2008) 12 *African Skies* 26.

<sup>34</sup> African Union, ‘Statute of the African Space Agency’ <[https://au.int/sites/default/files/treaties/36198-treaty-statute\\_african\\_space\\_agency\\_e.pdf](https://au.int/sites/default/files/treaties/36198-treaty-statute_african_space_agency_e.pdf)> accessed 13 September 2023.

<sup>35</sup> Maia Moore, ‘African space agencies have the potential to lead the global space race’ (Space News, 2 May 2023) < <https://spacenews.com/african-space-agencies-have-the-potential-to-lead-the-global-space-race/>> accessed 13 September 2023.

<sup>36</sup> Asia-Pacific Regional Space Agency Forum, ‘About APRSAF’ < <https://www.aprsaf.org/about/>> accessed 19 August 2023.

<sup>37</sup> Asia-Pacific Regional Space Agency Forum, ‘Countries and Regions’ <<https://www.aprsaf.org/participants/>> accessed 11 September 2023.

<sup>38</sup> Asia-Pacific Regional Space Agency Forum, ‘International Organizations’ < [https://www.aprsaf.org/participants/international\\_organizations.php](https://www.aprsaf.org/participants/international_organizations.php)> accessed 11 September 2023.

<sup>39</sup> Asia-Pacific Regional Space Agency Forum, ‘About APRSAF’ <<https://www.aprsaf.org/about/>> accessed 19 August 2023.

region.<sup>40</sup> The forum meets annually, with its 29<sup>th</sup> session being held at the end of September 2023.<sup>41</sup>

Members of ESA, most notably the UK and France have their own very-active national Space agencies but are also members of ESA. ESA was itself established by the Convention for the establishment of a European Space Agency,<sup>42</sup> which amalgamated previous European space research and development organisations.<sup>43</sup> With respect to law enacted by ESA and agreed to by its member States, the focus is mainly on rules and regulations setting specific standards for the activities of ESA itself, or also for ESA member States, such as Industrial Policy Rules and Regulations,<sup>44</sup> Rules on Information, Data and Intellectual Property,<sup>45</sup> Security Regulations,<sup>46</sup> and General Clauses and Conditions for ESA Contracts.<sup>47</sup> Thus, for the European States that are Members States to ESA, its law is also of consideration with respect to their conduct of Outer Space activities and their companies that are engaged with Outer Space. For example, the Department for Business, Enterprise and Innovation in Ireland, having been an ESA Member State since 10<sup>th</sup> December 1980,<sup>48</sup> upon seeking for the Irish Government (*An*

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<sup>40</sup> Asia-Pacific Regional Space Agency Forum, ‘Principles of APRSAF’ <<https://www.aprsaf.org/about/pdf/Principles.pdf>> accessed 11 September 2023: “APRSAF aims to promote and expand peaceful uses of space activities and their applications for socio-economic development in Asia and the Pacific.”

<sup>41</sup> Asia-Pacific Regional Space Agency Forum, ‘Annual Meetings’ <[https://www.aprsaf.org/annual\\_meetings/](https://www.aprsaf.org/annual_meetings/)> accessed 11 September 2023.

<sup>42</sup> Conference of Plenipotentiaries, ‘Convention for the establishment of a European Space Agency’ (opened for signature 30 May 1975, entered into force 30 October 1980) CSE/CS (73)19, rev.7.

<sup>43</sup> European Space Agency, ‘ESA Convention Booklets’ <[https://www.esa.int/About\\_Us/ESA\\_Publications/ESA\\_Convention\\_Booklets](https://www.esa.int/About_Us/ESA_Publications/ESA_Convention_Booklets)> accessed 19 August 2023: “[t]he beginnings of an independent space organisation in Europe were in the early 1960s, with the creation of the European Launcher Development Organisation (ELDO) and the European Space Research Organisation (ESRO).”

<sup>44</sup> European Space Agency, ‘Regulations of the European Space Agency: Industrial Policy Rules and Regulations’ (1 July 2015) ESA/REG/009.

<sup>45</sup> European Space Agency, ‘Regulations of the European Space Agency: Rules on Information, Data and Intellectual Property’ (23 April 2014) ESA/REG/008.

<sup>46</sup> European Space Agency, ‘Regulations of the European Space Agency: Security Regulations’ (1 July 2020) ESA/REG/004, rev.2.

<sup>47</sup> European Space Agency, ‘Regulations of the European Space Agency: General Clauses and Conditions for ESA Contracts’ (5 July 2019) ESA/REG/002, rev. 3.

<sup>48</sup> European Space Agency, *ESA Convention and Council Rules of Procedure* (8<sup>th</sup> edn, ESA Communications 2019) 9.

*Dáil*) to ratify the Outer Space Treaty 1967,<sup>49</sup> noted that this step was in response to the fact that “[t]he number of Irish-based companies engaged with the European Space Agency has grown by almost 60 per cent in the last five years: from 55 companies in 2015 up to 87 in 2020.”<sup>50</sup>

While ESA is the primary body of concern with respect to Outer Space activities in the European region, it is also important to highlight that law may begin to be enacted with respect to Outer Space from the European Union (EU), though this prospect remains uncertain.<sup>51</sup> Article 189 of the Treaty on the Functioning of the European Union (TFEU) outlines “[t]o promote scientific and technical progress, industrial competitiveness and the implementation of its policies, the Union shall draw up a European space policy.”<sup>52</sup> It is further established that the EU “shall establish any appropriate relations with the European Space Agency”<sup>53</sup> and it is recognised that the EU may not harmonise the “laws and regulations of the Members States”<sup>54</sup> with respect to Outer Space laws. Nevertheless in 2021, the European Parliament and Council introduced Regulation (EU) 2021/696 “establishing the Union Space Programme and the European Union Agency for the Space Programme and repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU”.<sup>55</sup> While the regulation expressly recognises the EU competences with respect to harmonisation outlined in Art 189(2)

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<sup>49</sup> Pat Leahy, ‘One small step as Ireland pledges not to make claims in outer space’ (29 June 2022, *The Irish Times*) < <https://www.irishtimes.com/science/space/2022/06/29/tds-to-be-asked-to-vote-on-pledge-not-to-conquer-outer-space/> > accessed 19 August 2023.

<sup>50</sup> *Ibid.*

<sup>51</sup> Charlie JP Bennett, ‘A Future ‘EU Space Law’: A Few Constitutional Considerations’ (EJIL: Talk!, 8 August 2023) < <https://www.ejiltalk.org/a-future-eu-space-law-a-few-constitutional-considerations/> > accessed 19 August 2023: “[a]lthough the final dimensions of an ‘EU Space Law’ remain unknown for now”.

<sup>52</sup> Treaty on the Functioning of the European Union, art 189(1).

<sup>53</sup> *Ibid* art 189(3).

<sup>54</sup> *Ibid*, art 189(2).

<sup>55</sup> Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme and repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU [2021] OJ L170/69.

TFEU,<sup>56</sup> it is significant that the EU is a potential party in the domain of Outer Space activities of EU member States should EU competencies be altered.

While domestic and regional space laws are not the focus of this research, outlining the legal environment for States that conduct activities in Outer Space is important as it is into this context that further recommended regulation, international in nature in the case of this research, would be introduced. While this chapter discusses in depth the existing ISL framework, certain agreements between States, State-based Space agencies and private actors are also increasing in nature, particularly as collaborative Outer Space activities are being undertaken. This is evident in the re-invigorated focus on missions to the Moon and with it, the Artemis Accords and the formation of new Memorandums of Understanding.

### **5.1.1.3 Collaborative Agreements: Memorandums of Understanding (MOUs) and Bi-Lateral Agreements**

Announced in 2019, NASA's Artemis Accords set about "inviting other states to join with NASA and commercial providers in the return of humans to the Moon and then on to Mars."<sup>57</sup> The role of the Accords themselves is described as being "to establish a common vision via a practical set of principles, guidelines, and best practices to enhance the governance of the civil exploration and use of outer space with the intention of advancing the Artemis Program"<sup>58</sup> whose mission's aim is to return to the Moon. The

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<sup>56</sup> Treaty on the Functioning of the European Union, art 189(2).

<sup>57</sup> Melissa de Zwart, Stacey Henderson and Rachel Neef, 'Legal and Ethical Planetary Protection Frameworks for Crewed Missions' in Melissa de Zwart, Stacey Henderson, John Culton, Deborah Turnbull and Amit Srivastava (eds), *Human Uses of Outer Space: Return to the Moon* (Springer 2023) 63.

<sup>58</sup> NASA, 'The Artemis Accords Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes' (13 October 2020).

way in which other “international space agencies”,<sup>59</sup> as they will be inter-agency agreements, are intended to become a party to the Artemis Accords is by means of “executing bilateral Artemis Accords agreements, which will describe a shared vision for principles”.<sup>60</sup> Thus, different space agencies do not all become parties to one agreement, as is envisaged with respect to a treaty, but rather enter into separate bi-lateral agreements with NASA.

Alongside the Artemis mission to the Moon, there also exists a joint effort between Russia and China to go to the Moon. This joint effort is based upon a memorandum of understanding (MOU), a non-binding form of agreement which Lyall and Larsen note “has become an integral tool in the elaboration of rights and duties, privileges and immunities, in international space activities.”<sup>61</sup> In 2021, Russia and China entered into a MOU agreeing to collaboratively construct a research station on the Moon.<sup>62</sup> However, MOUs have not newly arisen with the latest race to the Moon. For example, while the International Space Station was agreed upon in the 1998 Agreement,<sup>63</sup> “[v]arious memoranda of understanding (MOUs) between the participants deal with multitudinous details of the supply of sections of the ISS and its construction.”<sup>64</sup>

Thus, both formal and informal agreements made between States, space agencies and/or private actors are all influential in illustrating the current landscape of legal obligations tied to the various activities that are on-going in Outer Space. The space laws that this

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<sup>59</sup> NASA, ‘The Artemis Accords: Principles for a Peaceful, Safe and Prosperous Future’ <[https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords\\_v7\\_print.pdf](https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords_v7_print.pdf)> accessed 19 August 2023.

<sup>60</sup> Ibid.

<sup>61</sup> Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2018) 33.

<sup>62</sup> Andrew Jones, ‘China, Russia enter MoU on international lunar research station’ (Space News, 9 March 2021) <<https://spacenews.com/china-russia-enter-mou-on-international-lunar-research-station/>> accessed 19 August 2023.

<sup>63</sup> Agreement among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, The Government of the Russian Federation, and the Government of the United States of America concerning Cooperation on the Civil International Space Station’ (entered into force 29 January 1998)

<sup>64</sup> Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2018) 112.

chapter discusses thus far all apply alongside the ISL framework. The understanding of space law as a whole, including the laws that States are carrying out their activities in accordance with outside of the ISL framework informs this research's context of Space Law. This contextual understanding informs the recommendations for the regulation of the use of weapons in Outer Space which this research forms from the perspective of the principle of humanity in IHL.

#### **5.1.1.4 International Law**

The ISL framework that this research focuses on in Section 5.3 is that spear-headed by the United Nations since the era of the 'Space Race', made up of principles, declarations and five binding treaties.

The UN institutions with a primary role in Outer Space activities are UNOOSA and UNCOPUOS. Between the two, the focus of this research necessitates a focus mainly on the work of UNCOPUOS, but the role of UNOOSA is nevertheless significant. UNOOSA "works to promote international cooperation in the peaceful use and exploration of space, and in the utilisation of space science and technology for sustainable economic and social development",<sup>65</sup> which includes the role of ensuring the optimisation of Outer Space for the achievement of the UN Sustainable Development Goals, also known as the Space4SDGs initiative. With regards to the creation of the five UN Treaties in the space law framework as discussed in Section 5.3, UNCOPUOS played a significant role and is described by Lyall and Larsen as being "valuable in the development of space law".<sup>66</sup> It continues to be UNCOPUOS where discussion over legal issues arising in Outer Space occurs today, but as outlined with respect to weapons regulation instruments for Outer

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<sup>65</sup> United Nations Office for Outer Space Affairs, 'About Us' <<https://www.unoosa.org/oosa/en/aboutus/index.html>> accessed 19 August 2023.

<sup>66</sup> Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2018) 18.

Space in this chapter, discussions on topics relevant to this research are also occurring in other fora.

In addition, there are other institutions that contribute to ISL, one such institution being the International Telecommunications Union (ITU), “the specialised United Nations agency charged with managing radio frequencies and orbital positions for satellites”.<sup>67</sup> The Constitution of the ITU outlines in Art 1(2)(a) that one of the roles of the ITU is the “allocation of bands of the radio-frequency spectrum, the allotment of radio frequencies and the registration of radio-frequency assignments and, for space services, of any associated orbital position in the geostationary-satellite orbit or of any associated characteristics of satellites in other orbits, in order to avoid harmful interference between radio stations of different countries”.<sup>68</sup> Thus, the role of the ITU is significant in dealing with and allocating spaces in orbit to the growing number of satellites in Outer Space.

As noted, the international legal instruments discussed in Section 5.3 are those of the ISL framework that are most relevant for the purpose of this research, as well as the attempts at weapons regulation instruments specific to Outer Space also dealt with in this chapter. The majority of the relevant instruments have arisen out of the role of UNCOPUOS, but it is again important to investigate the other institutions with a role in ISL, the majority of which are institutions or agencies of the UN. The role of institutions in the monitoring of compliance with ISL informs the recommendations that this research makes with regards to a supervisory body overseeing the regulation of the use of weapons in Outer Space.

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<sup>67</sup> Helena Mendonça, Magda Cocco Correia and Juliana Macedo Scavuzzi dos Santos, ‘International Laws Regulating Satellite Communications and Their Intentional Disruption in Times of Peace and Conflict’ (2015) 40 *Annals Air & Space Law* 105, 109.

<sup>68</sup> Constitution and Convention of the International Telecommunications Union (concluded 22 December 1992, entered into force 1 July 1994) UNTS 1825, 1826 (1992 Constitution and Convention of the ITU) art 1(2)(a).

### 5.1.2 Who are the Space Actors to which this law applies?

As is the nature of most branches of international law, States are the primary subjects of ISL.<sup>69</sup> Blount highlights that “[i]t is no secret that international space law is a product of the Cold War”;<sup>70</sup> a time in which Outer Space exploration was reserved for States and States continue to be central Space actors today. However, unlike during 1950s and 60s, State are not the only actors in Outer Space. The advances that have occurred, especially with regards to the role of private actors in Outer Space since the time of the initial ‘Space Race’ have been extensive. Significantly, the ISL framework does not provide for the regulation of these private actors.

Chaben notes that “[b]y maintaining the state as the primary actor in space, the OST presents various obstacles”.<sup>71</sup> Article VI of the Outer Space Treaty 1967 recognises private actors only to the extent that their activities “require authorization and continuing supervision by the appropriate State Party to the Treaty”<sup>72</sup> and the responsibility for ensuring that the actions of these authorised and supervised actors conform with the obligations of the Outer Space Treaty rests on the State Party with which these actors are associated.<sup>73</sup> Chapter 6 discusses the increase in the role of these private actors, such as Space X and Blue Origin, which contribute to a crowded Outer Space environment and do so with States taking international legal responsibility for their actions.

Thus, while States are accompanied by private actors in modern Outer Space, the legal obligations of the ISL framework remain unchanged in that they apply only to States. The

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<sup>69</sup> Anthea Roberts and Sandesh Sivakumaran, ‘The Theory and Reality of the Sources of International Law’ in Malcolm D. Evans (ed), *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 89 notes that international law regulates “the rights and obligations of States and other international actors”.

<sup>70</sup> P. J. Blount, ‘Renovating Space: The Future of International Space Law’ (2011) 40 *Denver Journal of International Law and Policy* 515, 516.

<sup>71</sup> Jack B Chaben, ‘Extending Humanity’s Reach: A Public-Private Framework for Space Exploration’ (2020) 13(3) *Journal of Strategic Security* 75, 94.

<sup>72</sup> 1967 Outer Space Treaty, art VI.

<sup>73</sup> *Ibid*: “States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities”.

lack of legal obligations upon private actors in ISL is an important consideration for this research as the regulation of weapons use in Outer Space sits at the intersection of ISL and IHL. In IHL, non-State actors that actively participate in armed conflict situations, which often involves weapons use, could be considered to be non-state armed groups. As noted in Chapter 3, different IHL provisions apply to conflicts involving non-state armed groups than those involving States, which is why it is important to establish the category of armed conflict from the parties involved. Alternatively, if under the instruction of and paid by States, they could be considered as mercenaries. With the increase in private Space actors and the possibility that they could access and use weapons in Outer Space, the recommendations that this research forms for the regulation of the use of weapons in Outer Space needs to also consider the status of private Space actors should they become involved in weapons use during an armed conflict in Outer Space.

Having examined the laws that apply with respect to activities in Outer Space and the actors that these laws apply to, the following sections investigate the ISL framework. Section 5.2 analyses the UN GA declarations that dealt with Outer Space activity and laid the foundation for the binding ISL framework. Section 5.3 examines the five treaties in the ISL framework and how they contribute to the regulation of Outer Space and this research's focus on the regulation of the use of weapons in Outer Space. Section 5.4 then analyses the existing attempts in the ISL framework to address the gap in the legal regime with regards to weapons use in Outer Space.

## **5.2 UN GA Declarations related to Activities in Outer Space**

In addition to binding legal instruments, which are investigated in Section 5.3, there are numerous UN GA declarations which also form an essential part of the existing ISL framework by outlining principles which should be adhered to during activities in Outer

Space. Furthermore, despite their non-binding nature, some of these principles served to lay the foundation for future binding regulations. This was the case in the creation of the 1967 Outer Space Treaty, which is discussed in depth in Section 5.3, because it was predated by the 1963 Declaration of Legal Principles, analysed below.

### **5.2.1 1963 Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space<sup>74</sup>**

Introduced in UN GA Resolution 1962 (XVIII),<sup>75</sup> these principles formed the foundations for the 1967 Outer Space Treaty,<sup>76</sup> having been enacted with the view that, as noted by the Soviet representative at the GA Committee meeting, a “declaration of principles governing outer space activities of States...must be an international document similar to a treaty, which would contain firm legal obligations on the part of States.”<sup>77</sup> In 1964 Simsarian stated that “[l]aw and order in outer space were significantly advanced by the U.N. General Assembly”<sup>78</sup> through its adoption of this declaration. The declaration was “approved unanimously by the General Assembly”<sup>79</sup> and indicated principles that were agreed upon with regards to how the exploration and use of Outer Space should be conducted. Some of the central concerns addressed by the UN GA Committee in the declaration included political aspects with regards to potential uses of Outer Space and the recognition of mankind as a rights-bearer, as is discussed in the following sections.

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<sup>74</sup> United Nations General Assembly, ‘Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space’ (13 December 1963) RES 1962 (XVIII) (1963 Declaration of Legal Principles).

<sup>75</sup> Ibid.

<sup>76</sup> 1967 Outer Space Treaty. See also confirmation of this in Francis Lyall and Paul B Larsen, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2018) 50: “[t]he OST provides a solid foundation for the development of much of space law. It translates into treaty obligations the basic ideas expressed in those earlier UN Space Resolutions, and particularly in the ‘Principles’ Declaration of 1963.”

<sup>77</sup> UN COPUOS, First Committee Verbatim Records on the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space (1963) A/C.1/PV.1342, pp. 41-42.

<sup>78</sup> James Simsarian, ‘Outer Space Co-Operation in the United Nations in 1963’ (1964) 58(3) *The American Journal of International Law* 717.

<sup>79</sup> Ibid 718.

### 5.2.1.1 Political Aspects of Outer Space Activities

The UN GA Declaration constituted the first step towards progress with regards to Space Law at a time when it was evident that “international agreements cannot be obtained in disregard of political realities.”<sup>80</sup> Schick emphasises that even if the Declaration were nothing “more than an expression of good intentions, it still would seem erroneous to doubt its significance as a moral-political preliminary towards the creation of such international rules as are to govern earth-related space activities.”<sup>81</sup>

Despite the significant achievement that was the reaching of a political consensus on the contents of the 1963 Declaration, the content of the preamble nevertheless reins in the political freedom of the signatories. For example, the preamble recalls UN GA Resolution 110 (II) of the 3<sup>rd</sup> of November 1947, which “condemned propaganda designed or likely to provoke or encourage any threat to the peace, breach of the peace, or act of aggression”<sup>82</sup> and re-iterates that this resolution applies equally to the territory of Outer Space as it does to Earth. Schick highlights that “[f]ollowing an original proposal of the Austrian delegation, the General Assembly, ‘inspired by the great prospects opening up before mankind as a result of man’s entry into space...’ solemnly refreshed the memory of its members by recalling...its resolution 110 (II)”<sup>83</sup>. The opportunities for the Space-faring States of the time and humankind as a whole that were presented by the exploration and use of Outer Space were outlined in light of the past actions of humankind and the need to utilise these opportunities for the future for peace.

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<sup>80</sup> F.B. Schick, ‘Problems of a Space Law in the United Nations’ (1964) 13(3) *The International and Comparative Law Quarterly* 969.

<sup>81</sup> *Ibid* 970.

<sup>82</sup> 1963 Declaration of Legal Principles, preamble.

<sup>83</sup> F.B. Schick, ‘Problems of a Space Law in the United Nations’ (1964) 13(3) *The International and Comparative Law Quarterly* 969, 978.

The 1963 Declaration was introduced in the midst of the Space Race between the United States and the USSR. This time period saw the acceleration of technology into Outer Space, including satellites which could potentially broadcast and disseminate information of all kinds, including propaganda. In the aftermath of WWII and the role that propaganda played therein, the UN GA thus reiterated that 1947 Resolution 110 (II), which condemned the use of propaganda,<sup>84</sup> equally applied to Outer Space. This also aligned with the preambles' promotion of the use of Outer Space for "peaceful purposes",<sup>85</sup> a concept which is discussed in greater detail in Section 6.3 with regards to the Outer Space Treaty.

The inclusion of such considerations is illustrative of the concern for States acting in their own political interests. This is similarly a concern with respect to the possibility of weapons use by States and is discussed in Chapter 6. Chapter 6 also discusses the nature of Outer Space as the ultimate 'high ground' because a State that gains control over Outer Space can exercise its power over Earth. This level of control may entice States to act in their political interests, over the interests of humankind as a whole. Thus, the regulation of the use of weapons in Outer Space that this research forms recommendations for is important. The introduction of the concept of humankind as a rights-bearer in the Declaration also served as a prospective limitation on States sovereignty, as is discussed below.

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<sup>84</sup> United Nations General Assembly, 'Resolution 110(II): Measures to be taken against propaganda and the inciters of a new war' A/RES/2/110 (3 November 1947) para 1: "[c]ondemns all forms of propaganda, in whatsoever country conducted, which is either designed or likely to provoke or encourage and threat to the peace, breach of the peace, or act of aggression".

<sup>85</sup>1963 Declaration of Legal Principles, preamble.

### 5.2.1.2 'Mankind' as a Rights-Bearer in International Law

'Mankind', a category which Fasan notes encapsulates "the whole of all human beings, the whole of humanity",<sup>86</sup> essentially aligning with the humankind interpretation of humanity that Chapter 2 discusses, is a central reference in the 1963 Declaration. The position of the interests of all of mankind in the exploration of Outer Space is outlined in the preamble, with reference made to the "common interest of all mankind",<sup>87</sup> as well as recognizing the potential use of the exploration of Outer Space for "the betterment of mankind and for the benefit of States irrespective of their degree of economic or scientific development".<sup>88</sup> This is consolidated further in the first principle which outlines that "the exploration and use of outer space shall be carried on for the benefit and in the interests of all mankind".<sup>89</sup> Thus, the universal benefit of humankind is seen to be deeply rooted at the foundations of ISL principles, as Chapter 2 mentions.

While ISL is a branch of international law, which itself mainly deals with the rights of States or international actors, mankind appears as a central rights-bearer therein. While the concept of considerations of mankind is broad compared to those of individuals or a State, there are advocates for the attribution of legal significance and the status of rights-bearer to 'mankind'. One such advocate is Fasan, who "regards the prominent place occupied by the term 'mankind' in the Space Treaty as a step towards allowing 'mankind' to become a new subject of international law,"<sup>90</sup> with States being the primary subjects of international law. However, Bueckling highlights the challenges with regards to mankind as a rights-bearer that arise when trying to "translate them into actual

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<sup>86</sup> Ernst Fasan, 'The Meaning of the Term Mankind in Space Legal Language' (1974) 2 *Journal of Space Law* 125.

<sup>87</sup> 1963 Declaration of Legal Principles, preamble.

<sup>88</sup> *ibid.*

<sup>89</sup> *ibid* principle 1.

<sup>90</sup> Adrian Bueckling, 'The Strategy of Semantics and the Mankind Provisions of the Space Treaty (1979) 7 *Journal of Space Law* 15, 19.

international practice”.<sup>91</sup> This can be seen in the case of Russia, which has “denied...all legal significance”<sup>92</sup> to ‘mankind’, as universal acceptance of an international legal significance of ‘mankind’ would “imply a permanent limitation of national sovereignty”.<sup>93</sup> In discussing the impact of the classification of a territory as the ‘common heritage of mankind’, which is discussed elsewhere in this chapter, Joyner highlights that a territory being allocated for mankind as a whole would mean “common space areas would be regarded legally as regions owned by no one, though hypothetically managed by everyone. Sovereignty would be absent, as would all its legal attributes and ramifications.”<sup>94</sup> Thus, with mankind as a rights-bearer, States would no longer have complete authority and decision-making power over their territory, as the wider category of mankind (not just mankind within the territory of the State) would have to be considered.

Despite the lack of State consensus on whether ‘mankind’ should become a category of legal significance, the inclusion of mankind as a rights bearer in the 1963 Declaration, and in binding ISL treaties as is seen in Section 5.3, is illustrative of how it is a central consideration of ISL. It is humankind that recommendations for the regulations of weapons use in Outer Space seeks to protect from unnecessary suffering, hence its relevance for this research.

Considerations with respect to the interests of mankind as a whole could be seen to have similarities with the more recent concept of the inclusion of a fourth generation of human rights in international human rights law. The conceptualisation of human rights into the

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<sup>91</sup> Ibid 21.

<sup>92</sup> Ibid 18.

<sup>93</sup> Ibid 22.

<sup>94</sup> Christopher C Joyner, ‘Legal Implications of the Concept of the Common Heritage of Mankind’ (1986) 35(1) *The International and Comparative Law Quarterly* 190, 191.

‘generations’ framework was introduced in the 1970s by Karel Vašák.<sup>95</sup> Under the ‘generations’ framework, those rights recognised as civil and political rights are first generation rights; economic, social and cultural rights are second generations rights; and third generation rights were described by Vašák as “rights of solidarity”,<sup>96</sup> encompassing “the right to development, the right to a healthy and ecologically balanced environment, the right to peace, and the right to ownership of the common heritage of mankind”.<sup>97</sup> The description of ‘solidarity rights’ could see rights of mankind as falling under that generation, but in recent times, discussion has emerged with respect to a fourth generation of human rights which would extend Vašák’s framework. However, Risse outlines that “[w]hat fourth-generation rights are supposed to cover has varied, from future generations or genetic lineage to women, indigenous people, or technological change.”<sup>98</sup> While Risse discusses a fourth generation of human rights that applies in digital worlds,<sup>99</sup> the recognition of future generations of humankind is an element that is addressed in this chapter with respect to the Moon Agreement<sup>100</sup> and the ‘common heritage of mankind’. It is this discussion of the rights of humankind, and the future generations of humankind, to Outer Space that could link ‘mankind’ as a rights bearer as outlined in the 1963 Declaration to this modern topic of human rights discourse, a discussion that was predated by the Declaration. While mankind’s status as a rights-bearer is disputed amongst States, Tan notes that its inclusion in the 1963 Declaration was important as these principles served as “strong principles of equity, fairness, and common interest”<sup>101</sup> in relation to mankind as a whole during the formation of the binding sources of ISL as

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<sup>95</sup> Karel Vašák ‘Human Rights: A Thirty-Year Struggle: the Sustained Efforts to give Force of law to the Universal Declaration of Human Rights’ (1977) 11 UNESCO Courier, 29–32.

<sup>96</sup> Ibid 29.

<sup>97</sup> Ibid.

<sup>98</sup> Mathias Risse, ‘The Fourth Generation of Human Rights: Epistemic Rights in Digital Lifeworlds’ (2021) Carr Centre for Human Rights Policy, Harvard Kennedy School, Harvard University Discussion Paper, 8.

<sup>99</sup> Ibid.

<sup>100</sup> 1979 Moon Agreement.

<sup>101</sup> David Tan, ‘Towards a New Regime for the Protection of Outer Space as the Province of All Mankind’ (2000) 24 Yale Journal of International Law 145, 161.

discussed in Section 5.3. The consideration of the rights of humankind as a whole, present and future, aligns with the considerations of humankind that are underpinning the rationale behind the formation of regulation for the use of weapons in Outer Space. The consequences of weapons use in the Outer Space domain are central to the formation of regulations from the lens of the principle of humanity in IHL, which seeks to limit the amount of unnecessary suffering during armed conflict situations. These considerations all focus on the safety of humankind as a whole, similar to its rights.

Overall, the 1963 Declaration lay the foundation for the formation of the cornerstone of the binding Space Law framework in the form of the 1967 Outer Space Treaty. This Declaration's general principles were expanded upon by the UN GA in a number of additional declarations and principles which were introduced thereafter, as is discussed in the following sub-sections.

### **5.2.2 1982 Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting<sup>102</sup>**

These principles outlined how the UN GA envisaged the use of satellites for television broadcasting would be governed in the Outer Space legal regime. It was recognised that “the operation of international direct broadcasting satellites [would] have significant international political, economic, social and cultural implications”<sup>103</sup> and thus, regulation would be required to ensure international cooperation. For example, the principles seek to ensure satellite use for this purpose to be carried out while maintaining “the sovereign rights of States, including the principle of non-intervention, as well as with the right of

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<sup>102</sup> United Nations General Assembly, ‘Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting’ (10 December 1982) A/RES/37/92 (1982 Broadcasting Principles).

<sup>103</sup> Ibid preamble.

everyone to seek, receive and impart information and ideas”.<sup>104</sup> Thus, the principles seek to guide State behaviour in regards to respecting State sovereignty but also encouraging cooperation in information-sharing practices, with principle 6 recognising the role that direct television broadcasting would have in developing States.<sup>105</sup>

Again, the focus of the principles was on the universal benefit that could potentially be garnered from direct broadcasting satellites, such as activities being carried out to

“promote the free dissemination and mutual exchange of information and knowledge in cultural and scientific fields, assist in educational, social and economic development, particularly in the developing countries, enhance the qualities of life of all peoples and provide recreation with due respect to the political and cultural integrity of States”.<sup>106</sup>

The rights and benefits as outlined in the principles highlight that “all States and peoples are entitled to and should enjoy the benefits from”<sup>107</sup> direct broadcasting activities. This re-iterates what the GA outlined in the 1963 Declaration of Principles, which was the aspiration that Outer Space should be of benefit to all mankind. While direct television broadcasting is only one of the ways in which Outer Space benefits humankind as a whole, it is illustrative of the facilities provided through Outer Space that could be affected should weapons be used in Outer Space, recommendations for the regulation of which are formed by this research.

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<sup>104</sup> Ibid principle 1.

<sup>105</sup> Ibid principle 6: “[s]pecial consideration should be given to the needs of the developing countries in the use of international direct television broadcasting by satellite for the purpose of accelerating their national development.”

<sup>106</sup> Ibid principle 2

<sup>107</sup> Ibid principle 5

### 5.2.3 1986 Principles Relating to Remote Sensing of the Earth from Outer Space<sup>108</sup>

As defined in Principle I of these UN GA principles, remote sensing of the Earth from Outer Space refers to “the sensing of the Earth's surface from space by making use of the properties of electromagnetic waves emitted, reflected or diffracted by the sensed objects, for the purpose of improving natural resources management, land use and the protection of the environment”.<sup>109</sup> Principle II re-iterates the aim of conducting remote sensing for the “benefit and in the interests of all countries, irrespective of their degree of economic, social or scientific and technological development, and taking into particular consideration the needs of the developing countries.”<sup>110</sup> This implicit reference to the consideration of mankind is nevertheless accompanied by recognition of State sovereignty. This is seen in the specification that remote sensing activities

“shall be conducted on the basis of respect for the principle of full and permanent sovereignty of all States and peoples over their own wealth and natural resources, with due regard to the rights and interests, in accordance with international law, of other States and entities under their jurisdiction. Such activities shall not be conducted in a manner detrimental to the legitimate rights and interests of the sensed State.”<sup>111</sup>

Thus, while remote sensing activities should benefit all States, they should not be conducted in a way which could compromise any State’s sovereignty and jurisdiction over their own territory and the natural resources contained thereon, even if these resources are detected by remote sensing conducted by another State entirely. This illustrates a balancing of States interests and benefits in these principles. Remote sensing activities are a use of Outer Space which would be interrupted and likely made unavailable if weapons use were to occur in Outer Space. Thus, the regulation of the use of weapons in Outer Space would assist in making Outer Space a more secure

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<sup>108</sup> United Nations General Assembly, ‘Principles Relating to Remote Sensing of the Earth from Outer Space’ (3 December 1986) RES 41/63 (1986 Remote Sensing Principles).

<sup>109</sup> Ibid principle I(a).

<sup>110</sup> Ibid principle II

<sup>111</sup> Ibid principle IV

environment in which remote sensing activities could be carried out. This research forms recommendations for such regulation of the use of weapons in Outer Space.

#### **5.2.4 1992 Principles Relevant to the Use of Nuclear Power Sources in Outer Space<sup>112</sup>**

As is outlined in Section 5.4, nuclear weapons are subject to binding regulation in the Limited Test Ban Treaty<sup>113</sup> and 1967 Outer Space Treaty.<sup>114</sup> However, nuclear power sources and the use thereof are the central concern of the 1992 principles adopted by the UN GA in Resolution 47/68.<sup>115</sup> These principles also implicitly recognise considerations of humankind with regards to ensuring that attempts are made “to protect individuals, populations and the biosphere against radiological hazards”<sup>116</sup> should nuclear power sources be subject to irresponsible use in Outer Space. For this reason, the use of nuclear power sources in Outer Space are limited in Principle 3 to only “those space missions which cannot be operated by non-nuclear energy sources in a reasonable way.”<sup>117</sup> The limitation of the use of nuclear power sources in Outer Space to only those instances where the use of these energy sources are necessary is illustrative of a continued reluctance to allow nuclear objects to be placed in Outer Space, as seen with regards to the prohibition of nuclear weapons in the previously-mentioned instruments. The considerations outlined with regards to humans shows the considerations of humankind which would be subject to significant danger and suffering if nuclear power were to be used irresponsibly in the environment of Outer Space. These considerations of humankind underpin the use of the lens of the principle of humanity in IHL in this research to form

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<sup>112</sup> United Nations General Assembly, ‘Principles Relevant to the Use of Nuclear Power Sources in Outer Space’ (14 December 1992) RES 47/68 (1992 Nuclear Power Sources Principles).

<sup>113</sup> 1963 Limited Test Ban Treaty.

<sup>114</sup> 1967 Outer Space Treaty, art IV.

<sup>115</sup> 1992 Nuclear Power Sources Principles.

<sup>116</sup> *Ibid* principle 3.

<sup>117</sup> *Ibid*.

recommendations for the regulation of the use of weapons in Outer Space. Humankind as a whole requires much consideration when regulating for Outer Space activities as consequences of such activities could affect all of Earth's population.

### **5.2.5 1996 Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries<sup>118</sup>**

As many of the UN GA declarations and principles that are discussed outline, the benefit of all of humankind from activities conducted in Outer Space is a central consideration. The 1996 Declaration<sup>119</sup> was introduced with the desire that humankind's new interactions with Outer Space would "be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind".<sup>120</sup> The principles contained in this Declaration envisaged the promotion of international cooperation and collaboration between States with developed space-faring capacities and developing States. This cooperation could expand the benefit that Outer Space could have to a greater percentage of humankind. The introduction of the concept of humankind as a rights-bearer in the 1963 Declaration of Legal Principles<sup>121</sup> illustrates an aim towards attempting to regulate Outer Space from a universal perspective. Nevertheless, as the above analysis of some of the principles illustrates, political considerations such as the sovereignty of States remain central concerns during negotiations and thus, limit the scope of the rights of humankind.

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<sup>118</sup> United Nations General Assembly, 'Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries' (1996) RES 51/122.

<sup>119</sup> Ibid.

<sup>120</sup> Ibid preamble.

<sup>121</sup> 1963 Declaration of Legal Principles.

The principles introduced by the UN GA served as a means to find agreement between States on central points with regard to the use of Outer Space and some of these principles even constituted the first step towards binding agreements. The role of ‘soft-law’ or non-binding principles and declarations like those that this section analyses cannot be underestimated in the ISL framework which continues to develop, primarily through non-binding methods. Principles, declarations and guidelines have been, and continue to be, introduced by the specialised offices for Outer Space established by the UN GA, UNCOPUOS and UNOOSA. As Chapter 3 and Chapter 4 discuss, soft law is also an important contribution to the expansion of the IHL framework and assists in dealing with new or specific issues that arise in relation to IHL, including military uses of Outer Space. The different roles and State responses to hard and soft law efforts in both the IHL and ISL frameworks inform the recommendations for regulation of the use of weapons in Outer Space that Chapter 7 outlines.

While the non-binding framework of legal principles with respect to the regulation of Outer Space continues to expand, the central framework of international conventions which specifically deals with Outer Space has not expanded beyond the central five instruments introduced during and in the aftermath of the Space Race of the 1960’s, as described below.

### **5.3 ISL Treaty Framework**

Both general and specific international conventions serve as binding sources of the international law applicable to the territory of Outer Space.

The application of general international treaties is referenced in many of the Outer Space-specific instruments themselves. For example, the 1967 Outer Space Treaty, discussed below, notes in Article III that “States Parties to the Treaty shall carry on activities in the

exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law”.<sup>122</sup> Thus, instruments outlining for example, IHL as is discussed in Chapters 3 and 4 of this thesis, apply equally to Outer Space activities as they do to terrestrial activities.

However, specific Outer Space instruments, such as those addressed in this section, constitute the *lex specialis* and will therefore, take precedence over general international law instruments in the event of conflict between the laws. Abbreviated from the maxim of *lex specialis derogate legi generali*, this principle of international law establishes that if more than one source of international law applies to “the same subject matter, that which is more specific should prevail and be given priority over the more general rule.”<sup>123</sup> This is seen with regards to the principle in international law of *terra nullius*, which controversially referred to territory that was ‘unoccupied’ by any State’s people and thus, its possession was open to be claimed by another State.<sup>124</sup> Outer Space is territory that is not occupied or claimed by any other State. However, the Outer Space treaties constitute the *lex specialis* on this matter and as is discussed below, these instruments reject the application of the *terra nullius* principle to the territory to Outer Space by expressly prohibiting the appropriation of Outer Space by any State or international actor.<sup>125</sup> This section investigates the binding instruments introduced alongside the principles discussed in Section 5.2 which constitute the *lex specialis* of the international conventions applicable to Outer Space.

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<sup>122</sup> 1967 Outer Space Treaty, art III.

<sup>123</sup> Silvia Boreli, ‘The (Mis)-Use of General Principles of Law: Lex Specialis and the Relationship between International Human Rights Law and the Laws of Armed Conflict’ (2015) <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2575076](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2575076)> accessed 18 September 2023.

<sup>124</sup> Matthew Craven and Rose Parfitt, ‘Statehood, Self-Determination, and Recognition’ in Malcolm D. Evans (ed), *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 197.

<sup>125</sup> 1967 Outer Space Treaty, art II.

### **5.3.1 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies<sup>126</sup> (Outer Space Treaty)**

The first of the binding legal treaties specific to Outer Space was the 1967 Outer Space Treaty, which remains the “foundation of space law”<sup>127</sup> today, with a total of 112 States Parties as of January 2023.<sup>128</sup> The content of this treaty was heavily influenced by the 1963 Declaration of Legal Principles,<sup>129</sup> as previously discussed, and introduced some of the general binding regulations of Outer Space law upon which the rest of the instruments discussed in this section elaborated. Some of the central regulations which are analysed below include the requirement that Outer Space be used for peaceful purposes, the allocation of the title of ‘the province of all mankind’ to Outer Space, the prohibition of appropriation of Outer Space, and the maintenance of international peace and security in Outer Space. The final sub-section will also address the question of whether the 1967 Outer Space Treaty has become out-dated to the extent of invalidity in the current legal framework.

#### **5.3.1.1 Use of Outer Space for Peaceful Purposes**

The preamble of the Outer Space Treaty builds upon the 1963 Declaration of Legal Principles<sup>130</sup> and recognises “the common interest of all mankind in the progress of the

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<sup>126</sup> Ibid.

<sup>127</sup> Adam G. Quinn, ‘The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space’ (2008) 17 *Minnesota Journal of International Law* 475, 479.

<sup>128</sup> Committee on the Peaceful Uses of Outer Space Legal Sub-Committee, ‘Status of International Agreements relating to activities in outer space as at 1 January 2023’ (20-31 March 2023) A/AC.105/C.2/2023/CRP.3, pg. 12.

<sup>129</sup> 1963 Declaration of Legal Principles.

<sup>130</sup> Ibid.

exploration and use of outer space for peaceful purposes”.<sup>131</sup> This general requirement is elaborated upon in Article IV, which specifies that

“[t]he 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.”<sup>132</sup>

Article IV also includes a prohibition of the placing in Outer Space, in orbit or on a celestial body, of “nuclear weapons or any other kinds of weapons of mass destruction”<sup>133</sup> in the requirement for the use of Outer Space for peaceful purposes. The restrictions upon weapons in Outer Space in Article IV is central to this research as it creates the base level of weapons restrictions for the Outer Space environment. This standard has, as is further discussed in this chapter, been subject to attempted expansion through both binding and non-binding legal instruments, although a gap remains.

While the Outer Space Treaty constitutes the first time the use of Outer Space for peaceful purposes was enshrined in treaty law, Schick notes that the need to ensure that activities in Outer Space were conducted for peaceful purposes has been recognised “[s]ince the very inception of the idea that outer space activities urgently required the development of a space law”.<sup>134</sup> As already noted, the ‘peaceful purposes’ provision was seen in the Declaration of Legal Principles, but also was a consideration in UN GA Resolutions prior to this. However, prior references to the use of Outer Space for peaceful purposes were also expressed in more restrictive terms than the requirement as outlined in the 1967 Outer Space Treaty. For example, in A/RES/1148 (XII) in 1957, it was recognised that “outer space shall be exclusively for peaceful and scientific purposes”.<sup>135</sup> Following on from

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<sup>131</sup> 1967 Outer Space Treaty, preamble.

<sup>132</sup> Ibid art IV.

<sup>133</sup> Ibid.

<sup>134</sup> F. B. Schick, ‘Problems of a Space Law in the United Nations’ (1964) 13(3) *The International and Comparative Law Quarterly* 969, 974.

<sup>135</sup> United Nations General Assembly, ‘Regulation, limitation and balanced reduction of all armed forces and all armaments; conclusion of an international convention (treaty) on the reduction of armaments and

this, GA Res 1348 (XIII) in 1958 used less restrictive language in describing that “outer space should be used for peaceful purposes only”.<sup>136</sup> These limiting terms of ‘exclusively’ and ‘only’ were not included in the 1967 Outer Space Treaty, which, combined with the fact that, as Wolter notes, “states parties to the Treaty did not agree upon a definition of the peaceful purpose standard nor did the legal literature express a generally accepted definition of the term ‘peaceful’”,<sup>137</sup> has resulted in dispute surrounding the scope of the requirement of the use of Outer Space for peaceful purposes.

The common argument put forward in such dispute is that the term ‘peaceful purposes’ should be interpreted to mean ‘non-aggressive’<sup>138</sup> actions, meaning those actions which would not breach Article 2(4) of the Charter of the United Nations.<sup>139</sup> This interpretation would involve ‘peaceful purposes’ meaning that an action need only amount to not posing “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.”<sup>140</sup> However, Wolter notes that if the drafters of the treaty intended for ‘peaceful purposes’ to be interpreted as ‘non-aggressive’, “reference to the U.N. Charter (Article 2, paragraph 4) in Art III...would have been fully sufficient.”<sup>141</sup> Furthermore, it is noted that the

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the prohibition of atomic, hydrogen and other weapons of Mass destruction’ (14 November 1957) A/RES/1148(XII) para 1(f).

<sup>136</sup> United Nations General Assembly, ‘Questions on the Peaceful Uses of Outer Space’ (13 December 1958) A/RES/1348 (XIII) preamble.

<sup>137</sup> Detlev Wolter, ‘The Peaceful Purpose Standard of Common Heritage of Mankind Principle in Outer Space Law’ (1985) 9 ASILS International Law Journal 117, 118.

<sup>138</sup> Adam G. Quinn, ‘The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space’ (2008) 17 Minnesota Journal of International Law 475, 493. See also Jinyuan Su, ‘The “peaceful purposes” principle in outer space and the Russia-China PPWT Proposal’ (2010) 26 Space Policy 81, 83: “[t]he non-aggression doctrine holds that, as long as they conform to Article 2(4) of the UN Charter, which prohibits the threat and use of force, military uses of outer space are consonant with international law.” See also Christopher Petras, ‘The Debate over the Weaponization of Space – A Legal-Military Conspectus’ (2003) 28 Annals of Air and Space Law 171, 172: “over the course of time, a consensus developed within the United Nations that “peaceful” as it pertains to outer space more specifically equated to “non-aggressive”.

<sup>139</sup> 1945 Charter of the United Nations, art 2(4): “[a]ll 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.”

<sup>140</sup> *Ibid.*

<sup>141</sup> Detlev Wolter, ‘The Peaceful Purpose Standard of Common Heritage of Mankind Principle in Outer Space Law’ (1985) 9 ASILS International Law Journal 117, 123-124.

interpretation of peaceful purposes to only mean non-aggressive would contravene the principle of benefitting mankind, as established in the 1963 Declaration and contradict “the very essence of [this] principle to allow nonpeaceful uses of the space environment that would turn it into an arena of national military competition.”<sup>142</sup>

Nevertheless, “[t]he United States, from the very beginning of the Space Age up to the present, has maintained the official position that ‘peaceful’ means ‘non-aggressive’ and not ‘non-military’”.<sup>143</sup> At the United Nations Conference on the Exploration and Peaceful Uses of Outer Space in Vienna in August 1968, the United States representative highlighted that “the use of military personnel and equipment for scientific research or any other peaceful purpose should not be prohibited”<sup>144</sup> because they would be essential to space activities, adding to their rationale that peaceful purposes should prohibit only aggressive actions, but continue to allow for military personnel and equipment in Outer Space.

In addition to the ‘peaceful purposes’ standard outlined in the 1967 Outer Space Treaty, Article III, as previously discussed, provides for compliance with international law “in the interest of maintaining international peace and security”.<sup>145</sup> Reference is also made to the UN Charter in Art III and the extension of States’ right to defence enshrined therein to States’ activities in Outer Space was approved by the Legal Sub-Committee of COPUOS, which “rejected the idea that the right of self-defense is not applicable in regard to outer space.”<sup>146</sup> However, it was concluded that if the UN Charter is to apply to Outer

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<sup>142</sup> Ibid 141.

<sup>143</sup> Jackson Nyamuya Maogoto and Steven Freeland, ‘Space Weaponization and the United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?’ (2007) 41(4) *The International Lawyer* 1091, 1100.

<sup>144</sup> U.N. COPUOS, ‘Statement by US Ambassador Goldberg’ (1966) Legal Subcommittee, 5th Session, U.N. Doc. A/AC.IOS/CJ/SR.62.

<sup>145</sup> 1967 Outer Space Treaty, art III.

<sup>146</sup> Jackson Nyamuya Maogoto and Steven Freeland, ‘Space Weaponization and the United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?’ (2007) 41(4) *The International Lawyer* 1091, 1099.

Space as existing international law, “the bar on the use of force under Article 51 of the United Nations Charter likewise applies in Outer Space.”<sup>147</sup>

Thus, the peaceful purpose standard as enshrined in the 1967 Outer Space Treaty may require further clarification and expansion, especially “as the extent of military uses of outer space envisaged by military strategists has drastically increased, and the feasibility of new and more sophisticated spacebased weapon systems draws nearer.”<sup>148</sup> While Section 5.4 will analyse some of the weapons-regulation instruments specific to Outer Space, as the cornerstone of the ISL framework, the ambiguity of the ‘peaceful purposes’ standard continues to present a challenge to interpretation today, wherein a clear distinction between ‘non-military’ and ‘non-aggressive’ is becoming increasingly necessary.

Furthermore, the ‘peaceful purposes’ standard enshrined in the Outer Space Treaty has not quelled the militarisation of Outer Space, as is analysed in Chapter 6, nor has it reduced the need to introduce weapons regulation, with existing additions to the space law framework in this respect discussed below. The maintenance of ‘peaceful purposes’ in Outer Space activities remains a central aim, but this standard is not a panacea and must be supported by specific and targeted regulation with respect to weapons use in Outer Space. This research forms recommendations for such regulation that addresses the weapons use gap that exists in both the ISL and IHL frameworks with regard to Outer Space.

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<sup>147</sup> Ibid.

<sup>148</sup> Detlev Wolter, ‘The Peaceful Purpose Standard of Common Heritage of Mankind Principle in Outer Space Law’ (1985) 9 ASILS International Law Journal 117, 118.

### 5.3.1.2 Province of All Mankind

Article I of the 1967 Outer Space Treaty recognises that

“[t]he 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, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.”<sup>149</sup>

As discussed in Section 5.2, the considerations of mankind was introduced with respect to Outer Space in the 1963 Declaration of Legal Principles. It was enshrined in binding treaty-law in Article I, wherein Outer Space was granted the category of the province of mankind.

However, apart from the specification that Outer Space activities should be for the benefit of all States, the province of mankind was not defined in the 1967 Outer Space Treaty. Thus, the extent of the benefits of mankind that are assured by Article I are not clarified with respect to Outer Space. Furthermore, Tan highlights that “[i]t should be emphasized that the concept of the ‘province of all mankind’ is not to be equated or confused with the notion of the ‘common heritage of mankind’”.<sup>150</sup> As is analysed in relation to the Moon Agreement, the common heritage of mankind, as it is noted by Koch, is “conceived as an expansion of the province of all mankind within international space law”.<sup>151</sup> However, this categorization of Outer Space was not supported for in the 1967 Outer Space Treaty. This was evident during the negotiations of the Working Group which resulted in the formation of the Outer Space Treaty, during which the United Arab Republic proposed that Article I of the treaty also note that

“States engaged in the exploration of outer space undertake to accord facilities and to provide possibilities to the non-space Powers, to enable them to participate

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<sup>149</sup> 1967 Outer Space Treaty, art I.

<sup>150</sup> David Tan, ‘Towards a New Regime for the Protection of Outer Space as the Province of All Mankind’ (2000) 24 *Yale Journal of International Law* 145, 162.

<sup>151</sup> Jonathan Sydney Koch, ‘Institutional Framework for the Province of all Mankind: Lessons from the International Seabed Authority for the Governance of Commercial Space Mining’ (2018) 16 *Astropolitics* 1, 7.

in and to draw benefit from the exploration and the use of outer space for the aim of deriving practical benefits related to their economic and social development.”<sup>152</sup>

This illustrated a proposal to extend the ‘province of all mankind’ towards the concept of ‘common heritage of mankind’ for the benefit of States that did not, at that time, have space-faring capacities. However, the outcome remained as the vague categorization of Outer Space as the ‘province of mankind’, of which there is no accepted legal definition. As a result, Tan notes that we still only know “what the ‘province of all mankind’ does not mean”,<sup>153</sup> as opposed to what it does mean. This means that the concept of ensuring the use of Outer Space for the benefit of mankind, having arisen in the 1963 Declaration of Legal Principles, remains uncertain and ambiguous under a category that is not legally defined.

The allocation of the status of ‘the province of mankind’ to Outer Space in the Outer Space Treaty must be considered with respect to the recommendation of regulation of weapons use in Outer Space as it was left ambiguous as to whether the status was intended to impose a certain level of protection on Outer Space and whether this would prevent weapons use in that environment. However, this is unlikely to be the case given the increase in militarisation and the space weapons, tests of some of which have already been undertaken as discussed in Chapter 6.

Thus, it is important when forming recommendations for regulation of the use of weapons in Outer Space to recognise the ‘peaceful purposes’ standard enshrined in the foundational space law instrument, but to also recognise the reality of its interpretation in

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<sup>152</sup> U.N. COPUOS, United Arab Republic: Proposal, Working Paper No 8 (22 July 1966) Legal Sub Committee, 5<sup>th</sup> Session, A/AC.105/35, Annex III, p. 6.

<sup>153</sup> David Tan, ‘Towards a New Regime for the Protection of Outer Space as the Province of All Mankind’ (2000) 24 *Yale Journal of International Law* 145, 163.

States' Outer Space activities, as the recommendations that this research will form must be informed from both perspectives.

### **5.3.1.3 Non-Appropriation of Outer Space**

An important issues addressed in the 1967 Outer Space Treaty was that of providing for the non-appropriation of Outer Space by a State or Space actor. Outer Space is not to become the property of or owned by any Space actor. This is provided for in Article II of the 1967 Outer Space Treaty,<sup>154</sup> as is discussed below.

#### **5.3.1.3.1 Article II Outer Space Treaty**

Article II of the 1967 Outer Space Treaty anticipated the prospect of States attempting to claim ownership over the territory of Outer Space – as previously is discussed with regards to the principle of *terra nullius*.<sup>155</sup> Thus, this article serves to prohibit the claiming of Outer Space or the Moon “by claim of sovereignty, by means of use or occupation, or by any other means.”<sup>156</sup> This requirement for the regulation of claims of ownership by States over the Moon, which stemmed from former territorial colonial experiences,<sup>157</sup> was nevertheless progressive as colonisation of the Moon remains a consideration today.

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<sup>154</sup> 1967 Outer Space Treaty, art II.

<sup>155</sup> Matthew Craven and Rose Parfitt, ‘Statehood, Self-Determination, and Recognition’ in Malcolm D. Evans (ed) *International Law* (5<sup>th</sup> edn, Oxford University Press 2018) 197.

<sup>156</sup> 1967 Outer Space Treaty, art II.

<sup>157</sup> See Peter Jankowitsch, ‘The Background and History of Space Law’ in Frans von der Dunk and Fabio Tronchetti (eds) *Handbook of Space Law* (Edward Elgar Publishing 2015) 5: “[m]ost importantly perhaps, unlike the continents and seas newly discovered by European empires and their natives in previous centuries, outer space, including the moon and all other celestial bodies, is not subject to national appropriation.”

### 5.3.1.3.2 The Anthropocene and Earth's Depleting Lifespan

The question of why the appropriation of Outer Space is a concern is rooted in the physical effects of the Climate Crisis on Earth,<sup>158</sup> and its escalation through activities such as “[o]vergrazing, deforestation, urbanization, and pollution”.<sup>159</sup> These characteristics are indicative of the current geographical era of mankind, with Earth as its vehicle for survival. This era was coined the ‘Anthropocene’ by Crutzen and Stoermer in 2000.<sup>160</sup> In this era, we see and experience the effects of humanity’s existence and human activity on the Earth. What this means is that, as Olson and Messeri note, the experience of life on Earth is currently that of “inhabiting an environmental predicament that humans have made and now exist inside.”<sup>161</sup> As Gruner notes, the slow but steady exhaustion of Earth as a home for humankind has resulted in a search for viable options for the future and survival.<sup>162</sup> The concern is that this search has turned to Outer Space and celestial bodies such as the Moon and Mars as potential future vehicles for humankind. While Article II of the 1967 Outer Space Treaty prohibits appropriation of Outer Space and celestial bodies, which human habitation in Outer Space would seem to breach, it is nevertheless a consideration, as the following sub-section discusses. As Chapter 1 and Chapter 6 discuss, Space tourism is already of concern in introducing humans into Outer

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<sup>158</sup> See Tapio Schneider, ‘Climate 1970 – 2020’ in Philippe Tortell, *Earth 2020: An Insider’s Guide to a Rapidly Changing Planet* (Open Book Publishers 2020) 25: “[i]n response to this warming, the Arctic’s summer sea ice cover has plummeted 40% and is approaching its demise. Arctic summers without sea ice will soon be a reality, with enormous implications for human livelihoods and regional ecology. Across the globe, increasing temperatures are associated with a wide range of climate concerns, including stronger rain storms, prolonged droughts and sea level rise.” See also at 26: “[o]ther processes are also important, including changes in cloud cover, effects of air pollution on clouds, uptake of heat by turbulent ocean circulations and uptake of CO<sub>2</sub> by the ocean and land biosphere.”

<sup>159</sup> Brandon C. Gruner, ‘A New Hope for International Space Law: Incorporating Nineteenth Century First Possession Principles into the 1967 Space Treaty for the Colonization of Outer Space in the Twenty-First Century’ (2004) 35(1) *Seton Hall Law Review* 299, 300.

<sup>160</sup> Paul J Crutzen and Eugene F Stoermer, ‘The Anthropocene’ (2000) 41 *Global Change Newsletter* 17-18.

<sup>161</sup> Valerie Olson and Lisa Messeri, ‘Beyond the Anthropocene: Un-Earthing an Epoch’ (2015) 6 *Environment and Society: Advances in Research* 28.

<sup>162</sup> Brandon C. Gruner, ‘A New Hope for International Space Law: Incorporating Nineteenth Century First Possession Principles into the 1967 Space Treaty for the Colonization of Outer Space in the Twenty-First Century’ (2004) 35(1) *Seton Hall Law Review* 299.

Space that could constitute civilians if an armed conflict were to occur in Outer Space. The prospect of Space habitation could result in more potential civilians in a potential ‘theatre of warfare’, as Chapter 6 examines, that would require protection from weapons use in Outer Space.

### **5.3.1.3.3 Possibility of Outer Space Habitation**

This future could be seen in mining for resources from the Moon and Mars, where “scientists have discovered deposits of water ice and other valuable mineral deposits- including helium-3, the ideal fuel for fusion power”,<sup>163</sup> but the colonisation of the Moon and/or Mars remains a prospect for humankind’s survival, particularly with the recent Artemis Mission seeking to return humankind to the Moon. It is to be noted that the term ‘colonisation’ is not supported by all involved in the research or development of the prospects of lunar habitation. For example, in 2019, Bill Nye said that “in the planetary community, we discourage the use of the verb 'colonize.' We prefer 'settle’”.<sup>164</sup> The preference not to use the term colonisation in discussions on the habitation plans for the Moon or deep Space in general is rooted in colonial past experienced on-Earth. Thus, the prohibition in Article II of the claiming of Outer Space, the Moon or other celestial bodies by any one State/group of States means that any habitation in Outer Space would need to be regulated to benefit all States and all of humankind and thus, require further regulation and clarification when the prospect becomes a reality.

The non-appropriation of Outer Space and the current developments which could pose future challenges to Art II are relevant to this research as these prospects all contribute to the increasingly congested nature of a contested environment which, as the detailed

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<sup>163</sup> Ibid 301-302.

<sup>164</sup> Mike Wall, ‘Bill Nye: It’s Space Settlement, Not Colonisation’ (Space.com, 25 October 2019) <<https://www.space.com/bill-nye-space-settlement-not-colonization.html>> accessed 13 September 2023.

description provided in Chapter 6 illustrates, is itself a ‘theatre of warfare’. Thus, the regulation of the use of weapons in Outer Space must factor into consideration such potential weapons use amongst the other activities being undertaken in Outer Space.

#### **5.3.1.4 Potential Invalidity of the Treaty?**

While widely recognised as the “cornerstone of space law”,<sup>165</sup> it has been questioned whether the 1967 Outer Space Treaty may have been rendered invalid over the passage of time since its introduction. Indeed, Quinn noted as early as 2008 that this treaty could be invalid by virtue of Article 62 of the Vienna Convention on the Law of Treaties.<sup>166</sup> According to the Vienna Convention, a fundamental change in circumstances surrounding a legal instrument may render it invalid.<sup>167</sup> Quinn argues that the Outer Space Treaty has undergone a fundamental change since it entered into force “because of the circumstances surrounding its creation, the changes in its interpretation, and because the usage of outer space today is a far cry from what was planned for in the 1960s.”<sup>168</sup>

While Quinn’s theory on the invalidity of the Outer Space Treaty is not widely supported,<sup>169</sup> the fact that elements of the Outer Space Treaty are of its time is recognised.

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<sup>165</sup> Adam G. Quinn, ‘The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space’ (2008) 17 *Minnesota Journal of International Law* 475, 487.

<sup>166</sup> Vienna Convention on the Law of Treaties (adopted 23 May 1969, entered into force 27 January 1980) UNTS vol 1151, p 330 (1969 Vienna Convention on the Law of Treaties) art 62.

<sup>167</sup> *Ibid*: “1. A fundamental change of circumstances which has occurred with regard to those existing at the time of the conclusion of a treaty, and which was not foreseen by the parties, may not be invoked as a ground for terminating or withdrawing from the treaty unless: (a) the existence of those circumstances constituted an essential basis of the consent of the parties to be bound by the treaty; and (b) the effect of the change is radically to transform the extent of obligations still to be performed under the treaty. 2. A fundamental change of circumstances may not be invoked as a ground for terminating or withdrawing from a treaty: (a) if the treaty establishes a boundary; or (b) if the fundamental change is the result of a breach by the party invoking it either of an obligation under the treaty or of any other international obligation owed to any other party to the treaty. 3. If, under the foregoing paragraphs, a party may invoke a fundamental change of circumstances as a ground for terminating or withdrawing from a treaty it may also invoke the change as a ground for suspending the operation of the treaty.”

<sup>168</sup> Adam G. Quinn, ‘The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space’ (2008) 17 *Minnesota Journal of International Law* 475, 496.

<sup>169</sup> Rather, the 1967 Outer Space Treaty is seen in need of updating, as opposed to being deemed invalid outright. See GS Sachdeva, ‘Outer Space Treaty: An Appraisal’ in Ajey Lele (ed), *50 Years of the Outer*

Despite its primary position in the space law framework, the Outer Space Treaty is often subject to criticism that “it is too weak to adequately govern space”.<sup>170</sup> However, as opposed to this being seen as rendering the 1967 Outer Space Treaty invalid under the Vienna Convention, it is rather put forward as a need to expand upon the provisions of the Outer Space Treaty through additional binding legislation.

The central concerns for Outer Space, while addressed in the 1967 Outer Space Treaty, were intended to be clarified, elaborated and subject to specific regulation in further instruments. This role of building upon the foundational 1967 Outer Space Treaty was intended for the following conventions and agreements. Such agreements focused on the regulation of the rescue of astronauts, the liability for damage caused in Outer Space, the registration of space objects and activities concerning the Moon. Many, but not all, of these instruments garnered much support and achieved the aim of expanding upon the 1967 Outer Space Treaty.

### **5.3.2 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space<sup>171</sup> (Rescue Agreement)**

The Rescue Agreement expressly notes that its introduction and the duties which it creates are “prompted by sentiments of humanity”.<sup>172</sup> While diverging from the reference to mankind as a whole as seen in other ISL instruments, the reference is appropriate with

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*Space Treaty: Tracing the Journey* (Pentagon Press 2017) 45: “[t]he OST, therefore, needs an overhaul to again become relevant to space governance”. It is also noted at 24 “[t]he Outer Space Treaty (OST) has been in operation for 50 years. It has proved its mettle and resilience to ensuing changes and advancing technologies to a great extent and for a long time. The drafters deserve commendation for their ingenuity in creating a farsighted and durable instrument.”

<sup>170</sup> Adam G. Quinn, ‘The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space’ (2008) 17 *Minnesota Journal of International Law* 475, 487.

<sup>171</sup> Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (opened for signature 22 April 1968, adopted 3 December 1968) UNGA Resolution 2345 (XXII) (1968 Rescue Agreement).

<sup>172</sup> *Ibid* preamble.

regards to considering the individual rights of the astronauts themselves. During the creation of the Rescue Agreement, a focus was on maintaining the sovereignty of the Contracting State in the event of an emergency landing, whereby it was emphasised by the French delegate and widely accepted that the obligation was on the Launching Authority or State to co-operate with the Contracting State, as opposed to placing the burden of co-operation on the Contracting State.<sup>173</sup> This can be seen in the agreement itself in Article 2, which notes that in the jurisdiction of the Contracting Party which is carrying out the rescue, “if assistance by the launching authority would help...the launching authority shall co-operate with the Contracting Party”<sup>174</sup> and “[s]uch operations shall be subject to the direction and control of the Contracting Party”.<sup>175</sup>

Thus, the cooperation of contracting parties to the Rescue Agreement is regulated with the central consideration of assisting astronauts in the event of “accident, distress, emergency or unintended landing”<sup>176</sup> in mind. Nevertheless, in the construction of the agreement, States parties ensured that their sovereign authority over their jurisdiction would remain intact, even in such an event. While the Rescue Agreement may not reference mankind, the general considerations of mankind seen as central throughout previous principles and the Outer Space Treaty have not diminished the centrality of State sovereignty, as the negotiations for the Rescue Agreement illustrate. The contracting States to the Rescue Agreement also stressed the need to work towards a liability convention, which was the next binding instrument in the ISL framework. The Rescue Agreement is illustrative of the provisions for and obligations regarding the safety for astronauts, the human presence in Outer Space, are provided for in the ISL framework.

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<sup>173</sup> U.N. COPUOS, ‘Draft agreement on the rescue of astronauts, the return of astronauts and the return of objects launched into outer space’ (1967) A/AC.105/C.2/L.28/Rev.1, page 4.

<sup>174</sup> 1968 Rescue Agreement, art 2.

<sup>175</sup> *Ibid.*

<sup>176</sup> *Ibid.*

However, the gap that this research has identified at the intersection of both the ISL and IHL frameworks with regards to weapons use in Outer Space means that the safety of humans in Space, as well as humankind as a whole, is not sufficiently provided for with regards to the consequences of such weapons use at present.

### **5.3.3 1972 Convention on International Liability for Damage Caused by Space Objects<sup>177</sup> (Liability Convention)**

The preamble of 1972 Liability Convention re-iterates the Outer Space Treaty's terminology of the "common interest of all mankind in furthering the exploration and use of outer space for peaceful purposes".<sup>178</sup> The Austrian delegate at the negotiations for the formation of the Liability Convention noted that "in evolving general principles, use should be made of the relevant provisions of existing international conventions such as the Antarctica Treaty and the Convention on the High Seas."<sup>179</sup> Despite reference to legal instruments that deal with areas that constitute the 'common heritage of mankind',<sup>180</sup> this categorisation was not allocated to Outer Space until the later Moon Agreement.

In addition to the rights of mankind, the rights of individuals who may have suffered damage as a result of space objects are also addressed in the preamble of this Convention which highlights the aim of the instrument "to ensure...compensation to victims of such

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<sup>177</sup> Convention on International Liability for Damage Caused by Space Objects (concluded 29 March 1972, entered into force 1 September 1972) UNTS vol. 961, p. 187 (1972 Liability Convention).

<sup>178</sup> Ibid preamble.

<sup>179</sup> U.N. COPUOS, Summary Record on the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Space (1963) Legal Sub-Committee A/AC.105/C.2/SR.16, page 5.

<sup>180</sup> While not expressly provided for, the 1959 Antarctic Treaty preamble provides that "in the interest of all mankind shall continue forever to be used exclusively for peaceful purposes", which alongside the freezing of claims of ownership over Antarctica in Article IV, has become accepted as allocating the region the status of the common heritage of mankind. See also 1982 United Nations Convention on the Law of the Sea, preamble, which outlines that the "area of the sea-bed and ocean floor and the subsoil thereof, beyond the limits of national jurisdiction, as well as its resources, are the common heritage of mankind".

damage”<sup>181</sup> that may be caused by space objects. Article I(d) defines a space object as including “component parts of a space object as well as its launch vehicle and parts thereof”,<sup>182</sup> the potential damage from which was deemed to include “loss of life, personal injury or other impairment of health; or loss or damage to property of States or of persons, natural or judicial, or property of international intergovernmental organizations”.<sup>183</sup>

Article II establishes the obligation that “a launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight.”<sup>184</sup> Damage caused by a space object elsewhere, such as to another space object, will also ensue a payment of compensation from the launching state if the damage is the fault of the launching State.<sup>185</sup> This agreement also provides for the establishment of a Claims Commission if no settlement can be reached between the States involved.<sup>186</sup>

While the majority of the agreement deals with the liability of States for their space objects and the actions of their space actors, Article XXII also allows for the acceptance and application of the standards of the agreement to “any international intergovernmental organization which conducts space activities”.<sup>187</sup> While intergovernmental organisations would be considered as apart from the private commercial actors currently operating in Outer Space, this indicates attribution of liability to an organisation other than a State in the event of damage being caused by space objects that they own or operate. As noted in the preamble to the agreement, “the establishment of such rules and procedures will contribute to the strengthening of international cooperation”<sup>188</sup> and such cooperation is also outlined in the body of the agreement with regards to “the possibility of rendering

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<sup>181</sup> 1972 Liability Convention, preamble.

<sup>182</sup> *Ibid* art I(d).

<sup>183</sup> *Ibid* art I(a).

<sup>184</sup> 1972 Liability Convention, art II.

<sup>185</sup> *Ibid*, art III.

<sup>186</sup> *Ibid*, art XIV.

<sup>187</sup> *Ibid*, art XXII.

<sup>188</sup> *Ibid*, preamble.

appropriate and rapid assistance to the State which has suffered the damage”<sup>189</sup> should the damage caused be of a significant nature. The allocation of liability for damage caused as outlined in this convention could become increasingly frequent and difficult to specifically ascertain should an armed conflict break out and weapons are used in the Outer Space environment, causing damage. The regulation of the use of weapons in Outer Space could provide for continued stability with regards to the liability regime in Outer Space and this research forms recommendations for such regulation.

#### **5.3.4 1974 Convention on Registration of Objects Launched into Outer Space<sup>190</sup>**

(Registration Convention)

While the preamble repeats the peaceful purposes aim and common interest of mankind as established in the 1967 Outer Space Treaty,<sup>191</sup> another central aim outlined in the Registration Convention was the establishment of “a mandatory system of registering objects launched outer space...would contribute to the application and development of international law governing the exploration and use of outer space”.<sup>192</sup> It was anticipated that the constantly-developing nature of the exploration of Outer Space would require updated and new regulations, which this convention aimed to contribute towards and help to encourage. In modern times, the increase in satellites in the territory of Outer Space means that the considerations of the 1974 Registration Convention are relevant now more than ever. Article VII of the Registration Convention, similar to the provision mentioned with regards to the 1972 Liability Convention, also provides for the application of the registration of space objects regime to “international intergovernmental organization

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<sup>189</sup> Ibid, article XXI.

<sup>190</sup> Convention on Registration of Objects Launched into Outer Space (concluded 12 November 1974, entered into force 15 September 1976) UNTS vol. 1023, p. 15 (1974 Registration Convention).

<sup>191</sup> 1967 Outer Space Treaty.

<sup>192</sup> 1974 Registration Convention, preamble.

which conducts space activities”.<sup>193</sup> The Registration Convention’s role in the recording of satellites has increased significantly with the drastic increase in satellites and satellite mega-constellations in recent times. The satellites registered as per the Convention’s protocol have been and continue to be used to support military operations during armed conflict situation on-Earth, which is seen with the on-going Russia-Ukraine conflict. As such useful military resources, satellites would constitute valuable targets if an armed conflict were to occur in Outer Space. The regulation of the use of weapons in Outer Space is important to the functioning of the Registration Convention in overseeing and regulating the provision of the satellite services to Earth today.

### **5.3.5 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies**<sup>194</sup> (Moon Agreement)

The preamble to the Moon Agreement outlines the aim to “promote on the basis of equality the further development of co-operation among States” and to “prevent the moon from becoming an area of international conflict”.<sup>195</sup> Essentially, the role of the Moon Agreement in the Space Law framework was envisaged as clarifying the application of the principles of the 1967 Outer Space Treaty to the specific territory of the Moon or other Celestial Bodies.

Article 3 elaborates on ensuring that the Moon can be used “exclusively for peaceful purposes”.<sup>196</sup> It is notable that more restrictive language is used in the peaceful purposes provision than is seen in the 1967 Outer Space Treaty, with the inclusion of ‘exclusively’

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<sup>193</sup> Ibid art VII.

<sup>194</sup> 1979 Moon Agreement.

<sup>195</sup> 1979 Moon Agreement, preamble.

<sup>196</sup> Ibid art 3.

and thus, the elimination of the ‘non-military’ or ‘non-aggressive’ dispute with regards to the Moon. Article 3 expressly establishes that the Moon is not for military purposes.

Further elaboration on the 1967 Outer Space Treaty is seen in Article 4, which illustrates that “[t]he exploration and use of the moon shall be the province of all mankind and shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development. Due regard shall be paid to the interests of present and future generations”.<sup>197</sup> The addition of the considerations of future generations in Article 4 foreshadows a central concern of the common heritage of mankind in the Moon Agreement.

In addition, the non-appropriation clause established in the Outer Space Treaty is also applied to the Moon, with it being noted that “[t]he moon is not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means.”<sup>198</sup> As previously discussed, the preparation for humankind’s return to the moon via the Artemis Mission is underway and as the return of human presence on the Moon grows nearer, the non-appropriation clause of the Moon Agreement becomes more important.

Article 11 outlines that “[t]he moon and its natural resources are the common heritage of mankind, which finds its expression...in particular in paragraph 5 of this article.”<sup>199</sup> Paragraph 5 specifies the need to establish an international regime “to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible.”<sup>200</sup> This means that the Moon and its resources belong mankind as a whole as opposed to any specific State or group of States. This illustrates the aim that the Moon

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<sup>197</sup> Ibid art 4.

<sup>198</sup> Ibid art 11(2).

<sup>199</sup> Ibid art 11(1).

<sup>200</sup> Ibid art 11(5).

being categorised as the common heritage of mankind would have practical effect and serve as a means to regulate resource extraction and the equitable division of these resources across mankind as a whole. The need for clarification with regards to the extraction of resources from the Moon, especially as the planned return of humans to the Moon is underway, is significant as resources could become a source of conflict between States. As the risk of weapons use in Outer Space grows nearer, the possible presence of weapons in Outer Space if conflict were to occur with regards to lunar resource extraction, it could become armed. Furthermore, as Chapter 6 discusses, Outer Space offers States with the military capabilities to gain control over it the ultimate ‘high ground’. While this would involve control over Earth, it could also involve control over the Moon and its resources. These possible contentious issues that the time is coming closer to address illustrate the need for not only the regulation foreseen in Article 11 of the Moon Agreement, but also the regulation of the use of weapons in Outer Space for which this research forms recommendations.

It was largely due to Article 11 and the inclusion of the common heritage of mankind principle that the final of the five UN instruments dealing with ISL was “widely rejected”.<sup>201</sup> There are only 18 States Parties to the agreement.<sup>202</sup> Quinn notes that this treaty, of all the ISL instruments discussed, anticipated “the inevitable exploitation of space”<sup>203</sup> and sought to use the common heritage of mankind principle to ensure that the benefits of this exploitation would be shared equitably among all of mankind. However, this principle also constitutes a significant restriction of the sovereignty of States, especially the Space-faring States that would be involved in the extraction of the

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<sup>201</sup> Adam G. Quinn, ‘The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space’ (2008) 17 *Minnesota Journal of International Law* 475, 479.

<sup>202</sup> UN COPUOS Legal Sub-Committee, ‘Status of International Agreements relating to activities in outer space as at 1 January 2023’ (20 March 2023) A/AC.105/C.2/2023/CRP.3, 12.

<sup>203</sup> Adam G. Quinn, ‘The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space’ (2008) 17 *Minnesota Journal of International Law* 475, 483.

resources. The considerations of these States thus outweighed the concerns of mankind as a whole and resulted in the rejection of the 1979 Moon Agreement.

As previously noted, the term ‘province of mankind’ was widely accepted with regards to Outer Space in the 1967 Outer Space Treaty. However, after the terms of the Outer Space Treaty had been decided upon and established by UN COPUOS, Argentinian Ambassador, Aldo Cocca, noted the “existence of a new subject of international law, namely mankind itself”,<sup>204</sup> which held responsibility over the common areas. This reference extended towards the notion of the common heritage of mankind, but the term the province of mankind has already been agreed upon and included in the 1967 Treaty.

The term ‘province of mankind’ does not have the specific legal definition of the ‘common heritage of mankind’. Ambassador Arvid Pardo delivered the Maltese proposal in 1967 at the UN GA on the agenda item “[e]xamination of the question of the reservation exclusively for peaceful purposes of the seabed and the ocean floor, and the subsoil thereof, underlying the high sea beyond the limits of present national jurisdiction, and the use of their resources in the interest of mankind”.<sup>205</sup> With respect to this proposal, he outlined the 5 elements required in order to establish a common heritage of mankind:

“[f]irst, the common heritage of mankind could not be appropriated; it was open to use by the international community but was not owned by the international community. Second, it required a system of management in which all users have a right to share. Third, it implied an active sharing of benefits, not only financial but also benefits derived from shared management and transfer of technology, thus radically transforming the conventional relationships between states and traditional concepts of development aid. Fourth, the concept of common heritage implied reservation for peaceful purposes, insofar as politically achievable, and, fifth, it implied reservation for further generations, and thus had environmental implications.”<sup>206</sup>

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<sup>204</sup> U.N. COPUOS, ‘Statement of Argentinian Ambassador Aldo Cocca’ (19 June 1967) Legal Sub-Committee, 6<sup>th</sup> Session U.N. Doc. A/AC. 105/C. 2/SR. 75.

<sup>205</sup> United Nations General Assembly, ‘Note verbale dated 17 August 1967 from the Permanent Mission of Malta to the United Nations addressed to the Secretary-General’ (18 August 1967) U.N. Doc A/6695.

<sup>206</sup> Arvid Pardo, ‘Law of the Sea Conference – What Went Wrong’ in Robert L Friedheim (ed), *Managing Ocean Resources: A Primer* (Routledge Taylor & Francis Group 1979) 141. See also Goldie, ‘A Note on Some Diverse Meanings of “The Common Heritage of Mankind”’ (1983) 10(1) *Syracuse Journal of*

The considerations of the common heritage of mankind with respect to the Moon Agreement is interesting for this research when its application to other territories in binding legal instruments prior to the introduction on the 1979 Moon Agreement is analysed. Antarctica was deemed to constitute a common heritage of mankind in the 1959 Antarctic Treaty.<sup>207</sup> Antarctica had been subject to numerous claims of sovereignty by different States on “geographical proximity, discovery, and establishing scientific bases.”<sup>208</sup> Due to these various claims, Antarctica was categorized a common heritage of mankind to reduce “militarization”<sup>209</sup> prospects and ensure “environmental protection.”<sup>210</sup> Furthermore, a category of law that developed alongside ISL was that of the Law of the Sea. The preamble of the 1982 United Nations Convention on the Law of the Sea declared that the “area of the sea-bed and ocean floor and the subsoil thereof, beyond the limits of national jurisdiction, as well as its resources, are the common heritage of mankind”.<sup>211</sup> As noted by Wolter, the “primary reason why the Ambassador from Malta introduced the common heritage of mankind principle into the law of the sea deliberations was the fear of a growing danger that the sea-bed would be used for the establishment of military installations.”<sup>212</sup> This suggestion by Ambassador Pardo, already mentioned, was an attempt to “curb the age-old...unrestricted allowance of use and exploitation”.<sup>213</sup> The categorisation of both Antarctica and the sea bed as the common heritage of mankind in order to curb militarisation and the prospect of escalation to conflicts between States over these areas is interesting to consider as this categorisation

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International Law and Commerce 69, 87. See also Siavash Mirzaee, ‘Outer Space and Common Heritage of Mankind: Challenges and Solutions’ (2017) 21(1) *Rund Journal of Law* 102, 104.

<sup>207</sup> 1959 Antarctic Treaty.

<sup>208</sup> Naman Khatwani, ‘Common Heritage of Mankind for Outer Space’ (2019) 17(2) *Astropolitics* 89, 95.

<sup>209</sup> *Ibid.*

<sup>210</sup> *Ibid.*

<sup>211</sup> 1982 United Nations Convention on the Law of the Sea, preamble.

<sup>212</sup> Detlev Wolter, ‘The Peaceful Purpose Standard of Common Heritage of Mankind Principle in Outer Space Law’ (1985) 9 *ASILS International Law Journal* 117, 127.

<sup>213</sup> Marjoleine Y.A. Zieck, ‘The Concept of ‘Generations’ of Human Rights and the Right to Benefit from the Common Heritage of Mankind with Reference to Extraterrestrial Realms’ (1992) 25(2) *Law and Politics in Africa, Asia and Latin America* 161, 179-180.

did not garner support for Outer Space as a whole, nor did it garner much support from States once included in the Moon Agreement and as Chapter 6 discusses, Outer Space has become increasingly militarised, with the potential of weaponisation, which is the focus of this research. Furthermore, this research highlights the element of the common heritage of mankind principle outline by Ambassador Pardo with regards to the considerations of future generations. This is illustrative of an additional consideration of humankind, by considering humankind of the future. This research, in using the principle of humanity in IHL as the lens for the analysis and the formation of recommendations for this research, focuses on the need to protect humankind from the consequences of the prospect of weapons use in Outer Space. However, this consequences from such weapons use could also have an impact on future generations of humankind. This research proposes that the considerations of future generations as seen in the common heritage of mankind principle already included in ISL discourse with respect to the 1979 Moon Agreement aligns with this research's rationale and considerations in adopting the principle of humanity in IHL as the lens of the research.

There are many parallels between the Moon and previously established common heritages of mankind such as Antarctica and the Sea Bed and the concept of the 'common heritage of mankind' was highlighted by the UN GA as central to the regulation of Outer Space from the establishment of the Committee on the Peaceful Uses of Outer Space.<sup>214</sup> However, in the majority of the ISL conventions discussed in this section, this concept was only addressed with regards to maintaining the interests of mankind, as opposed to establishing a common heritage of mankind in Outer Space.

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<sup>214</sup> United Nations General Assembly, 'International co-operation in the peaceful uses of outer space' (12 December 1959) RES 1472(XIV).

The prospect of establishing the Moon as a common heritage of mankind has been interpreted as constituting a positive obligation upon States requiring that “the use of outer space be carried out for the benefit and in the interest of all countries”,<sup>215</sup> as well as requiring the consideration of the potential needs of, and impact on, future generations, as outlined in Article 4 of the Moon Agreement.<sup>216</sup> Despite the fact that, as Khatwani notes, the introduction of the common heritage of mankind principle into the Moon Agreement was intended “to further enhance province of all mankind”<sup>217</sup> as established in the 1967 Outer Space Treaty, the majority of States Parties to the 1967 Treaty did not agree to expand their obligations further and refused to ratify the Moon Agreement.

Thus, the inclusion of the common heritage of mankind principle in the 1979 Moon Agreement was sparked by activities “taking place in outer space at that time and how states perceived them along with other political reasons and power struggles”.<sup>218</sup> It also constituted an elaboration of both the rights of mankind from the 1963 Declaration of Legal Principles and the province of mankind as established in the 1967 Outer Space Treaty. However, the common heritage of mankind provision resulted in the rejection of the Moon Agreement.

The current ISL framework saw this last convention introduced in 1979 and this framework has not been added to by any binding instrument since then, despite the advances in technology, science and Outer Space exploration capacities. However, as Section 5.1 demonstrates, this does not mean that the introduction of space law ceased. Instead, the focus shifted to domestic law or bi-lateral agreements and many soft-law instruments have been introduced during this time period and of course, general

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<sup>215</sup> Detlev Wolter, ‘The Peaceful Purpose Standard of Common Heritage of Mankind Principle in Outer Space Law’ (1985) 9 ASILS International Law Journal 117, 130.

<sup>216</sup> 1979 Moon Agreement, art 4.

<sup>217</sup> Naman Khatwani, ‘Common Heritage of Mankind for Outer Space’ (2019) 17(2) *Astropolitics* 89, 90.

<sup>218</sup> *Ibid* 90-91.

international law instruments also apply to the territory of Outer Space. Nevertheless, with regards to the central area of concern of this research – that of weapons regulation - Quinn notes that the 1967 Outer Space Treaty constitutes the “primary legal bar on space weaponization”<sup>219</sup> which exists. However, since the introduction of the existing ISL conventions, “space actors have been testing the limits of these treaties more and more frequently,”<sup>220</sup> which has resulted in the introduction of some weapons-specific binding ISL instruments, which will constitute the focus of the next section.

#### **5.4 Weapons Regulation Instruments for Outer Space**

As outlined in Section 5.3, the existing ISL framework is composed of five UN treaties, only four of which are widely ratified and while many of the central concerns with regards to Outer Space are addressed, the developments in the area of exploration and use of Outer Space have increased significantly since the framework was introduced. It is notable that the territory of Outer Space has always been a prospect for militarization, with the 1967 Outer Space Treaty prohibiting the placement of nuclear weapons and weapons of mass destruction in Outer Space, as well as the establishment of military installations on the Moon or other celestial bodies.<sup>221</sup> However, militarization has been steadily progressing towards weaponisation as technology has continued to develop, which is dealt with in greater depth in Chapter 6, and as noted by Major Douglas Anderson, the Outer Space Treaty did not anticipate the need to regulate for “the exotic

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<sup>219</sup> Adam G. Quinn, ‘The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space’ (2008) 17 *Minnesota Journal of International Law* 475, 476.

<sup>220</sup> *Ibid* 476-477.

<sup>221</sup> 1967 Outer Space Treaty, art IV: “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. 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.”

future weapons systems currently being proposed or researched”.<sup>222</sup> While this is the case, some weapons regulation instruments specific to Outer Space have been introduced which are important for this research because they could serve as a blueprint for future weapons regulation instruments for the territory of Outer Space.

#### **5.4.1 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water**<sup>223</sup> (Limited Test Ban Treaty)

This Treaty pre-dated the foundational 1967 Outer Space Treaty and was adopted in UN GA Resolution 1884 (XVIII).<sup>224</sup> This treaty called upon States not to carry out

“nuclear weapon test explosion, or any other nuclear explosion, at any place under its jurisdiction or control: (a) in the atmosphere; beyond its limits, including outer space; or under water, including territorial waters or high seas; or (b) in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted.”<sup>225</sup>

During the arms race of this period, this 1963 instrument, also referred to as the Limited Test Ban Treaty, aimed to meet this call from the UN by creating an agreement between the original parties of the United States, the U.K. and the Soviet Union that they would not undertake high-altitude nuclear detonations, as well as extending this prohibition to under water, land or the high seas. The preamble referenced the need to implement this nuclear weapons test ban in order to “put an end to the contamination of man’s environment by radioactive substances”.<sup>226</sup> This is illustrative of considerations of the consequences for the environment of humankind that resulted from the high altitude

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<sup>222</sup> Major Douglas S. Anderson, ‘A Military Look Into Space: The Ultimate High Ground’ (1995) Department of the Army Pamphlet 27-50-276 19, 24.

<sup>223</sup> 1963 Limited Test Ban Treaty.

<sup>224</sup> United Nations General Assembly, ‘Question of General and Complete Disarmament’ (17 October 1963) UNGA 5 A/RES/1884 (XVIII).

<sup>225</sup> 1963 Limited Test Ban Treaty, art I.

<sup>226</sup> Ibid preamble.

nuclear tests. This ban between the three States was extended to all States in Article IV of the 1967 Outer Space Treaty with its introduction four years later.

#### **5.4.2 1972 Treaty Between the United States of America and the Union of Soviet Social Republics on the Limitation of Anti-Ballistic Missile Systems<sup>227</sup> (ABM Treaty)**

In 1972, the ABM Treaty was another weapons prohibition agreement which was established bi-laterally between the U.S. and the Soviet Union. Unlike the Limited Test Ban Treaty, the preamble of this instrument expressly references that its introduction came “from the premise that nuclear war would have devastating consequences for all mankind”.<sup>228</sup> Thus, this reference to nuclear war expressly categorises the ABM Treaty as a weapons regulation instrument.

Furthermore, the weapons regulation standards of the ABM Treaty overlaps with the existing standards of the Space Law framework as established in the 1967 Outer Space Treaty, while specifying these standards to ABM weapons systems as “[e]ach Party undertakes not to develop, test, or deploy ABM systems or components which are sea-based, air-based, space-based, or mobile land-based.”<sup>229</sup> It is noted that the introduction of the ABM Treaty was primarily focused on “curbing the race in strategic offensive arms”<sup>230</sup> which was a central concern in Outer Space at the time. While successful, the United States later withdrew from the ABM Treaty, citing its outdated nature as the reason for the decision.<sup>231</sup> However, Maogoto and Freeland note that the “withdrawal provides

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<sup>227</sup> Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems (concluded 26 May 1972, entered into force 3 October 1972) UNTS vol. 944, p. 13 (1972 Anti-Ballistic Missile Treaty).

<sup>228</sup> Ibid preamble.

<sup>229</sup> 1972 Anti-Ballistic Missile Treaty, art V (1).

<sup>230</sup> Jackson Nyamuya, Maogoto and Steven Freeland, ‘Space Weaponization and the United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?’ (2007) 41(4) *The International Lawyer* 1091, 1092.

<sup>231</sup> Ibid.

the United States with few legal obstacles in developing strategic weapon systems, in particular space-based devices critical to its National Missile Defense program, and American space superiority.”<sup>232</sup>

#### **5.4.3 1988 UN GA Resolution on the Prevention of an Arms Race in Outer Space**

In 1988, the UN GA in Res 43/70 addressed the Prevention of an Arms Race in Outer Space (PAROS), a resolution which the GA adopts annually since then,<sup>233</sup> and noted the necessity and importance of both the ABM Treaty and the bi-lateral agreement between the United States and the USSR in helping to prevent the occurrence of any such arms race. Another essential component towards achieving this goal was noted as “strict compliance with existing arms limitation and disarmament agreements relevant to outer space, and with the existing legal regime concerning the use of outer space.”<sup>234</sup> This resolution nonetheless recognises that “the legal regime applicable to outer space by itself does not guarantee the prevention of an arms race in outer space, that this legal regime plays a significant role in the prevention of an arms race in that environment, [and] the need to consolidate and reinforce that regime and enhance its effectiveness”.<sup>235</sup>

Thus, while the UN GA recognises the role that these binding weapons regulation instruments have to play in preventing the weaponisation of Outer Space and ensuring the maintenance of international peace and security, as outlined in the 1967 Outer Space Treaty,<sup>236</sup> it is accepted that these instruments alone cannot achieve that goal. Rather, the

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<sup>232</sup> Ibid.

<sup>233</sup> Cassandra Steer, ‘The Woomera Manual: Legitimising or Limiting Space Warfare?’ (1<sup>st</sup> March 2021) in Nikki Coleman and Stephen Coleman (eds) *Military Space Ethics* (Howgate Publishing, forthcoming 2021) ANU College of Law Research Paper No. 21.5 < <https://ssrn.com/abstract=3802195>> accessed 17 February 2023, 10: “[e]very year, the UN General Assembly adopts the PAROS (Prevention of an Arms Race in Outer Space) resolutions”.

<sup>234</sup> United Nations General Assembly, ‘Prevention of an Arms Race in Outer Space’ (7 December 1988) RES 43/70 preamble.

<sup>235</sup> Ibid, para 2.

<sup>236</sup> 1967 Outer Space Treaty.

application of general international law standards or the extension of the existing ISL framework through the creation of new binding instruments is required. Nevertheless, the annual adoption by the UN GA of the PAROS resolution illustrates the continued recognition of many State of the increasing risk of weapons use in Outer Space and the consensus that the issue should be addressed. This research forms recommendations in order to address the regulation of the use of weapons in Outer Space.

#### **5.4.4 2008 & 2014 update of 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)<sup>237</sup>**

The closest attempt to creating a prohibition on the placement and/or the use of weapons in Outer Space is the 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). This draft treaty was introduced to the Conference on Disarmament in 2008 by Russia and China and an updated version of the treaty introduced again in 2014. The draft treaty is described as a “comprehensive ban on the deployment of space-based weapons and on threats of any kind against satellites”.<sup>238</sup> It does not, however, “does not ban Earth-to-space weapons, as it defines space weapons as weapons based in space”<sup>239</sup> and thus, would not address ASAT weapons, as discussed in Chapter 6.

The draft PPWT is illustrative of what Grego describes as Russia and China’s preference with respect to dealing with the prospects of weapons in Outer Space and that is with “a treaty-based approach negotiated under the United Nations auspices with the framework

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<sup>237</sup>2008 Draft PPWT and 2014 Draft PPWT.

<sup>238</sup> Laura Grego, ‘The Case for Space Arms Control’ in Melissa de Zwart and Stacey Henderson (eds) *Commercial and Military Uses of Outer Space* (Springer 2021) 89.

<sup>239</sup> Bledwyn E. Bowen, ‘Cascading Crises: Orbital Debris and the Widening of Space Security’ (2014) 12 *Astropolitics* 46, 58.

of preventing an arms race in space.”<sup>240</sup> Furthermore, as noted by Hao and Tronchetti, “other countries that have criticized [Russia & China’s] approach (i.e. the United States) have not made any constructive contribution to the PAROS debate”.<sup>241</sup> Thus, it is the draft PPWT that is currently the reference-point for the attempts at the prevention of the placement of weapons in Outer Space. However, while the PPWT does not fare well in the PAROS debates, it is noted that the introduction of the following resolution by the UN GA was “an attempt to move forward in the often stagnant PAROS discussions”.<sup>242</sup>

#### **5.4.5 2014 UN GA Resolution 69/32**

In 2014, the UN GA adopted Resolution 69/32 on No first placement of weapons in Outer Space.<sup>243</sup> The adoption of this resolution was notable because it was “first time that the General Assembly passes a resolution addressing a specific Prevention of an Arms Race in Outer Space (PAROS) issue”.<sup>244</sup> The resolution re-iterates many of the characteristics of space law, such as acknowledging ‘peaceful purposes’, and also recognises the previous efforts discussed in this section such as supporting the PPWT proposal by China and Russia. It also highlights “the importance of the political statements made by a number of States that they would not be the first to place weapons in outer space”,<sup>245</sup> which at the time consisted of 11 States, with Russia a notable inclusion.<sup>246</sup>

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<sup>240</sup> Laura Grego, ‘The Case for Space Arms Control’ in Melissa de Zwart and Stacey Henderson (eds) *Commercial and Military Uses of Outer Space* (Springer 2021) 89.

<sup>241</sup> Hao Liu and Fabio Tronchetti, ‘United Nations Resolution 69/32 on the ‘No first placement of weapons in space’: A step forward in the prevention of an arms race in outer space?’ (2016) 38 *Space Policy* 64, 66.

<sup>242</sup> *Ibid.*

<sup>243</sup> United Nations General Assembly, ‘No first placement of weapons in outer space’ (2 December 2014) A/RES/69/32.

<sup>244</sup> Hao Liu and Fabio Tronchetti, ‘United Nations Resolution 69/32 on the ‘No first placement of weapons in space’: A step forward in the prevention of an arms race in outer space?’ (2016) 38 *Space Policy* 64.

<sup>245</sup> United Nations General Assembly, ‘No first placement of weapons in outer space’ (2 December 2014) A/RES/69/32.

<sup>246</sup> *Ibid* 2, footnote 4: “Argentina, Armenia, Belarus, Brazil, Cuba, Indonesia, Kazakhstan, Kyrgyzstan, the Russian Federation, Sri Lanka and Tajikistan”.

In the resolution, it is noted that while the standstill with regards to an instrument like the PPWT exists, other measures would be needed and the possibility of a political commitment by States of not being the first to place weapons in Outer Space would thus be encouraged.<sup>247</sup> The PPWT and PAROS discussions, accompanied by the annual PAROS resolutions have not resulted in any space law measures that build upon the existing framework with respect to the placement or use of weapons in Outer Space, the prospect of which is discussed in more detail in Chapter 6, and as Tronchetti notes, “a coherent and comprehensive legal framework governing military activities in outer space is currently missing.”<sup>248</sup>

As discussed in Chapter 3 with respect to IHL, in recent times, soft law instruments have been more successful at gaining consensus and it is outlined that soft law efforts with respect to the application of IHL to the domain of Outer Space are currently being worked on with the McGill and Woomera Manual projects. However, as Chapter 4 discusses, the McGill Manual, which has been completed, does not deal with weapons regulation, and the Woomera Manual has yet to be completed. However, the projects for the drafting of these manuals continue to highlight the concern regarding the gap with respect to the regulation of the use of weapons in Outer Space. In addition to the soft-law UN GA declarations discussed in Section 5.2 and the binding conventions outlined in Section 5.3 and 5.4, the law applicable to Outer Space also includes Customary International Law.

## **5.5 Customary Space Law**

As outlined with respect to the formation of customary IHL in Chapter 3 of this thesis, customary space law has also formed where the requisite continued state practice and

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<sup>247</sup> Ibid.

<sup>248</sup> Fabio Tronchetti, ‘Legal Aspects of the Military Uses of Outer Space’ in Frans von der Dunk and Fabio Tronchetti (eds), *Handbook of Space Law* (Edward Elgar Publishing 2015) 332.

*opinio juris* have been fulfilled. While the area of Space Law is nascent with respect to the length of time it has been in existence, it is argued that provisions from the 1967 Outer Space Treaty, such as the non-appropriation provision, may have gained the status of customary international law.

In addition to provisions already established in treaty law, the beginning of customary international law specific to Outer Space is associated with the act of the launching of the USSR Sputnik I satellite in 1957,<sup>249</sup> which then orbited the Earth. Maogoto and Freeland note that “[a]lmost immediately, important principles of space law were born” from this act.<sup>250</sup> Judge Lachs in the *North Sea Continental Shelf Cases*<sup>251</sup> highlighted that

“[T]he first instruments that men sent into outer space traversed the air space of States and circled above them in outer space, yet the launching States sought no permission, nor did the other States protest. This is how the freedom of movement into outer space, and in it, came to be established and recognised as law within a remarkably short period of time.”<sup>252</sup>

Thus, free movement through air space to access Outer Space was considered to be established in customary international law<sup>253</sup> because States, primarily the United States and USSR, launched space objects that travelled through air space into Outer Space as if the practice were accepted in law and other States did not persistently object to this travel through their national airspace, also establishing an *opinio juris* that these practices were accepted as law.<sup>254</sup>

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<sup>249</sup> Prof Ram S Jakhu and Prof Steven Freeland, ‘The Relationship Between the Outer Space Treaty and Customary International Law’ (2016) 59<sup>th</sup> ISIL Colloquium on the Law of Outer Space, page 1.

<sup>250</sup> Jackson Nyamuya, Maogoto and Steven Freeland, ‘Space Weaponization and the United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?’ (2007) 41(4) *The International Lawyer* 1091, 1094.

<sup>251</sup> *North Sea Continental Shelf Cases (Federal Republic of Germany v. Denmark; Federal Republic of Germany v. Netherlands)* [1969] ICJ Reports p. 3.

<sup>252</sup> *Ibid.*

<sup>253</sup> See Vladlen S. Vereshchetin & Gennady M. Danilenko, ‘Custom as a Source of International Law of Outer Space’ (1985) 13(1) *Journal of Space Law* 22, 28 where it is noted that “[s]ome authors have expressed the view that at this stage there exists, or at least is emerging, a rule of customary law allowing free passage of space objects through the national air space of the other states.”

<sup>254</sup> *Ibid* 29: “[a]t the same time, the states concerned did not protest against the passage of space objects through their national air space. According to international law currently in force, the absence of protests on the part of states whose interests are affected, amounts to acquiescence in the practice relating to the

While a relatively young branch of international law, there is customary ISL that adds to the international space legal environment alongside the domestic and regional laws mentioned in Section 5.1 and of course, the core ISL framework with the 1967 Outer Space Treaty as its foundation. However, as Section 5.4 illustrates, there have not been many successful weapons regulation instruments in the ISL framework, with recent attempts such as Russia and China's draft PPWT remaining unsuccessful. It is based on the understanding of the landscape of space law and the gaps in this framework discussed in Section 5.6 that this research seeks to form recommendations for regulation of the use of weapons in Outer Space.

### **5.6 Gaps in the Current Space Law Framework**

The current Space Law framework as investigated in this chapter, including legal principles, conventional sources and customary international law, is increasingly becoming outdated as developments accelerate in the exploration and use of Outer Space.<sup>255</sup> The political interests of both States and private actors in the Outer Space industry are inherently linked to these developments and thus, the introduction of more modern regulation has been in the form of non-binding or advisory instruments which do not infringe upon the sovereignty and power of the central Space actors of today.

Further clarification is necessary with regards to some of the key terms used in the binding Space Law instruments. This is evident in the 1967 Outer Space Treaty and the disputed interpretation of the meaning of the use of Outer Space for 'peaceful purposes'.<sup>256</sup>

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passage of space objects. In other words, the failure to protest creates a presumption of a tacit recognition of the right of passage for space objects."

<sup>255</sup> Katherine Latimer Martinez, 'Lost in Space: An Exploration of the Current Gaps in Space Law' (2021) 11(2) *Seattle Journal of Technology, Environmental and Innovation Law* 322: "[t]he rapidly changing environment and advancements in outer space technology have created a pressing need for a new Outer Space Treaty, or at the very least a drastic change in space law and regulations."

<sup>256</sup> 1967 Outer Space Treaty, preamble and art IV.

Furthermore, as the categorisation of the Moon as the common heritage of mankind was widely rejected, a clear definition of what the ‘province of mankind’, as referenced in the Outer Space Treaty, constitutes is necessary.

For the purpose of this research, Section 5.4 outlines the significant gaps in the Space Law framework with regards to the use of weapons in Outer Space. Some of the difficulties with respect to this are outlined by Tronchetti as:

“(1) the use of outer space for military reasons is a highly sensitive issue and states are often reluctant to accept legal restrictions or prohibitions to such a use; (2) a unitary legal framework governing military operations in space is missing – instead, the applicable rules are distributed among various sources of law, including general public international law, international humanitarian law and international space law; (3) these rules fail, at times, to provide a clear understanding of key terms and concepts; and (4) space technologies (especially as for launch vehicles) and space objects (notably satellites) are usually of a dual-use character, as they have the potential to be used for civil and military applications.”<sup>257</sup>

Maogoto and Freeland note that the Space Law framework is “ill equipped to handle...the ambitious military programs of extant space powers seek[ing] to utilize the full spectrum of space technology for both defensive and offensive purposes.”<sup>258</sup> This absence of weapons regulation instruments for Outer Space can be accredited to the era in which this legal framework was introduced, during what Tan describes as a time “dominated by a superpower arms race”.<sup>259</sup> The considerations of weapons use in Outer Space did not span wider than the need to address the main weaponry concern on Earth at the time, that of nuclear weapons and weapons of mass destruction. However, as technological developments have increased the operability of weapons in Outer Space and more States (and private Space actors) have become involved in Outer Space activities, the need to

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<sup>257</sup> Fabio Tronchetti, ‘Legal Aspects of the Military Uses of Outer Space’ in Frans von der Dunk and Fabio Tronchetti (eds), *Handbook of Space Law* (Edward Elgar Publishing 2015) 331-332.

<sup>258</sup> Jackson Nyamuya, Maogoto and Steven Freeland, ‘Space Weaponization and the United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?’ (2007) 41(4) *The International Lawyer* 1091.

<sup>259</sup> David Tan, ‘Towards a New Regime for the Protection of Outer Space as the Province of All Mankind’ (2000) 24 *Yale Journal of International Law* 145, 163.

address this gap in the ISL framework has also increased. The current situation is that “more specific rules will almost certainly be required...to provide a comprehensive framework to properly protect humanity from otherwise disastrous consequences of outer space (potentially) becoming another theatre of warfare.”<sup>260</sup>

Thus, while the Space Law framework began at the international level, the regulation of Outer Space activities has gained further development in recent times through soft-law sources or alternatively, at the domestic level. The ISL framework benefits from legislative engagement from States, even at domestic level, because it only consists of five binding instruments and regulates a domain of ever-evolving and increasing activity. Nevertheless, the need for internationally-accepted rules to address the existing lacunae in the ISL framework cannot be over-looked.

## **5.7 Conclusion**

In this chapter’s investigation of the existing legal framework for Outer Space, Section 5.1 examines the laws applicable to Outer Space at domestic, regional and international levels. This section also looked at the Space Actors – States and the more recent addition of private Space actors, to whom the same Space Law does not apply as that which applies to States. While ISL is the focus of this research, the examination of the context of the formation of space law at all levels provides understanding of the legal environment for the regulation of Outer Space activities and in which the ISL framework exists. This informs the understanding of the legal framework, which alongside IHL, regulates the use of weapons in Outer Space and in which a gap with respect to this regulation exists. Section 5.2 analyses the UN GA declarations that were introduced with regards to specific

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<sup>260</sup> Steven Freeland, ‘In Heaven as on Earth? The International Legal Regulation of the Military Use of Outer Space’ (2011) 8 U.S.-China Law Review 272, 285.

issues in Outer Space and of which the 1963 Declaration of Legal Principles<sup>261</sup> forms the basis for the 1967 Outer Space Treaty.<sup>262</sup> Following on from this, Section 5.3 explores the Outer Space Treaty alongside the four other binding instruments in the ISL framework. Section 5.4 expands upon the central ISL framework by investigating the weapons regulation attempts that have been made with regards to weapons use in Outer Space. This analysis illustrates the gap at the intersection of the IHL and ISL frameworks that this research addresses through the formation of recommendations. Section 5.5 discusses the customary law within ISL and finally, Section 5.6 discusses the gaps in the ISL framework.

This chapter illustrates that as the range of ‘great prospects opening up before mankind’ that Section 5.0 references continue to expand, further regulation still is required to fill the existing lacunae in the Space Law framework. While additions to the ISL framework coming from soft law and domestic sources, the need for internationally-accepted standards increases as more States and private actors become involved in Outer Space activities, especially in the area of weapons regulation. Weapons regulation needs to be put in place to regulate the use of weapons by States, or even the possibility of private actors, in the same way that IHL regulates many other weapons. This research identifies the gap at the intersection of the IHL and ISL frameworks in the analysis of Section 5.4 focusing on the existing weapons regulation attempts with regards to Outer Space. The previous successful weapons regulation instruments for Outer Space were brought into force during the Cold War era. Since, States have been reticent to engage, as is seen with the stagnation of the PPWT. This stagnation could also be attributed to States’ political interests, as Chapter 6 discusses with regards to Outer Space and as Chapter 4 identifies with regards to States’ willingness to engage with weapons regulation. The PPWT was

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<sup>261</sup> 1963 Declaration of Legal Principles.

<sup>262</sup> 1967 Outer Space Treaty.

proposed by Russia and China and other States may not wish to align their interests with those of other Space powers. This gap that Section 5.4 identifies contributes towards the answering of research sub-question two of this thesis. It is also information for the recommendations for regulation to address this gap, as an understanding of the challenges faced by past weapons regulation attempts will provide a basis for the formation of more attainable recommendations.

With the legal framework application to Outer Space identified, which also contributes to the answer to research sub-question one, the following chapter provides an analysis of the current Outer Space environment – that of a ‘theatre of warfare’. The following chapter illustrates why this research is addressing the issue of the gap in the regulation of the use of weapons in Outer Space at an appropriate time, as the militarised nature of the Outer Space environment is escalating and the prospect of an armed conflict in Outer Space grows nearer.

## Chapter 6: Outer Space as a ‘Theatre of Warfare’

### 6.0 Introduction

“[O]uter space can...represent a future theatre of confrontations between countries”.<sup>1</sup>

The above quote from Becheru and Stan illustrates the escalating characterisation of Outer Space – that of a prospective ‘Theatre of Warfare’. While it is generally recognised that Outer Space is not yet weaponised,<sup>2</sup> the militarisation of this environment has been occurring since humankind first entered Space and has escalated since. From the launch of Sputnik I, the Centre for Strategic and International Studies (CSIS) 2023 Space Threat Assessment reports that there are 5465 satellites in Space,<sup>3</sup> with “more than 24,500 satellites are anticipated to be launched in the next 10 years”.<sup>4</sup> In addition to this crowding, to-date four States have demonstrated direct-ascent ASAT capabilities through testing – US, Russia, China and India.<sup>5</sup>

The potential for militarisation to become weaponisation in Outer Space is ever-increasing with the continued advancement of weapons technology and the constant introduction of new actors, State and private, into this militarised environment. NATO’s recognition of Outer Space as an ‘operational domain’ in 2019<sup>6</sup> merely confirmed what

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<sup>1</sup> Valentin Becheru and Adrian Stan, ‘Humanity, from Peaceful Exploration of Outer Space to Its Conquest through Space Forces, Anti-Satellite Weapons and State of the Art Space Technologies’ (2019) 11(1) *Annals – Series on Military Sciences* 68, 70.

<sup>2</sup> Air Commodore David Steele, ‘The Weaponisation of Space: The Next Arms Race?’ (2008) *Australian Defence Force Journal* 17: “[a]lthough space is ‘militarised’, it is not yet considered ‘weaponised’. That is, no country has deployed a destructive capability into space designed to destroy targets that are either space-based or ground-based.”

<sup>3</sup> Centre for Strategic and International Studies, ‘Space Threat Assessment 2023’ (April 2023) <[https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414\\_Bingen\\_Space\\_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ](https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414_Bingen_Space_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ)> accessed 13 September 2023, 2.

<sup>4</sup> *Ibid.*

<sup>5</sup> *Ibid* 4: “four countries—the United States, Russia, China, and India—have successfully tested direct-ascent ASAT weapons against their own satellites.”

<sup>6</sup> NATO, ‘NATO’s overarching Space Policy’ (17 January 2022) <[https://www.nato.int/cps/en/natohq/official\\_texts\\_190862.htm](https://www.nato.int/cps/en/natohq/official_texts_190862.htm)> accessed 10 August 2023, para 9.

was suspected to be true - Outer Space is humanity's latest 'Theatre of Warfare'. With this confirmation, it is evident that the introduction of the regulation of the use of weapons in Outer Space, for which this research forms recommendations, is a priority.

This chapter investigates the 'theatre of warfare' the is Outer Space and the militarised activities therein, which illustrates the urgency of the need to address the gap in the frameworks regulating the use of weapons in Outer Space, which this research does. Section 6.1 examines the term 'theatre of warfare' and attempts to ascertain an informal definition for the term, with Section 6.2 discussing the implication of Outer Space being labelled as a 'theatre of warfare'. Section 6.3 then analyses the topic of space security. Section 6.4 discusses the militarisation versus weaponisation debate. Section 6.5 provides a timeline of the process of militarisation of Outer Space that has constantly challenged space security and illustrates the growing need to address the use of weapons in Outer Space as militarised activities in Outer Space increase. Section 6.6 then analyses the 'Space Weapons' that currently exist in States military arsenals – both kinetic and non-kinetic weapons, with kinetic weapons constituting the focus of this research. Kinetic weapons are those which pose the most immediate risk to humankind which could cause unnecessary suffering. Thus, it is kinetic space weapons, and other kinetic weapons that can function in Outer Space, that this research forms recommendations for the regulation of through the lens of the principle of humanity in IHL. Section 6.7 discusses the significance of gaining the ultimate high ground that is Outer Space for States. Section 6.8 then examines the varying levels of engagement with Outer Space, and military Space activities, of different States. Finally, Section 6.9 follows on from the analysis of State Space actors by investigating the role of private Space actors in the Outer Space 'theatre of warfare'.

## 6.1 ‘Theatre of Warfare’

Outer Space has been developing into a ‘theatre of warfare’ since humankind’s first interaction with this vast expansive environment. As Maogoto and Freeland describe “[a]most as soon as Sputnik I was launched, the international community became concerned about the possibility for use of outer space for military purposes as well as the fear that it could perhaps ultimately be used as a theatre of war, particularly in the context of the prevailing Cold War.”<sup>7</sup> From the launch of Sputnik I onwards, activities in Outer Space have become more militarised, as the timeline in Section 6.5 of this chapter illustrates. The confirmation of Outer Space’s recognised status as a ‘theatre of warfare’ occurred in 2019 with the NATO’s inclusion of Outer Space into the alliance’s list of ‘operational domains’ alongside land, air, sea and cyberspace.<sup>8</sup> However, while the categorisation of a geographic region as a ‘theatre of warfare’ or an ‘operational domain’ arises often in IHL literature, no express definition is provided for these terms in legislation. Kleffner notes that during a time of armed conflict, “[t]he area in which operations are actually taking place at any given time is known as the ‘area of operations or ‘theatre’ of war”.”<sup>9</sup> Similarly, Topychkanov describes a ‘sphere of military operations’ as “the environment, factors, and conditions that must be taken into consideration for the successful application of force or execution of a particular military mission”<sup>10</sup> during an armed conflict. However, as Kleffner emphasises “these are not legal terms of art.”<sup>11</sup>

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<sup>7</sup> Jackson Nyamuya Maogoto and Steven Freeland, ‘Space Weaponization and the United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?’ (2007) 41(4) *The International Lawyer* 1091, 1095.

<sup>8</sup> NATO, ‘NATO’s overarching Space Policy’ (17 January 2022) <[https://www.nato.int/cps/en/natohq/official\\_texts\\_190862.htm](https://www.nato.int/cps/en/natohq/official_texts_190862.htm)> accessed 10 August 2023, para 9: “[i]n November 2019, NATO declared space as an operational domain, which will help to ensure a coherent approach to the integration of space into NATO’s overall deterrence and defence posture.”

<sup>9</sup> Jann K Kleffner, ‘Scope of Application of International Humanitarian Law’ in Dieter Fleck (ed) *The Handbook of International Humanitarian Law* (3<sup>rd</sup> edn, Oxford University Press 2013) 59.

<sup>10</sup> Petr Topychkanov, ‘Features of the Outer Space Environment’ in Alexei Arbatov & Vladimir Dvorkin (eds) *Outer Space: Weapons, Diplomacy, and Security* (Carnegie Endowment for International Peace 2010) 10.

<sup>11</sup> Jann K Kleffner, ‘Scope of Application of International Humanitarian Law’ in Dieter Fleck (ed) *The Handbook of International Humanitarian Law* (3<sup>rd</sup> edn, Oxford University Press 2013) 59.

Thus, while a ‘theatre of warfare’ may be recognisable during an armed conflict as the area in which armed hostilities are taking place, this is not a legally established definition nor does it clearly align with NATO’s concepts of ‘operational domains’ like Outer Space, in which armed hostilities have yet to occur. It is therefore necessary to investigate the categorisation of Outer Space as a ‘theatre of warfare’ and/or ‘operational domain’, track the series of events and central actors that culminated in this categorisation and finally, analyse the implications of categorising Outer Space as a ‘theatre of warfare’.

### **6.1.1 Mention of ‘Theatre of Warfare’ in IHL**

Some customary IHL refers to ‘theatre of warfare’ in regulating various instances that may arise during an armed conflict. However, these references do not provide an express definition of the term. With regards to using cultural property for military purposes, it is outlined in Germany’s Military Manual (1992) that “[t]he parties to the conflict shall take sufficient precautions to prevent cultural property from being used for military purposes”,<sup>12</sup> with an example being given that “[o]n 19 June 1944 all military installations were removed from Florence by order of the German authorities so as to prevent this abundant city of art from becoming a theatre of war.”<sup>13</sup>

The term arises again with regards to the removal of civilians from the vicinity of military objectives, with Israel’s Manual on the Rules of Warfare (2006) stating that “[t]he rules of war have laid down a number of rules of engagement in a theatre of war containing civilians”.<sup>14</sup>

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<sup>12</sup> Federal Ministry of Defence of the Federal Republic of Germany, ‘Humanitarian Law in Armed Conflict – Manual’ (1992) VR II, section 907.

<sup>13</sup>Ibid.

<sup>14</sup> Israel Military Advocate-General’s Corps Command, ‘Rules of Warfare on the Battlefield’ (IDF School of Military Law 2<sup>nd</sup> edn 2006) 27.

Under the same customary rule, the term ‘theatre of operations’ arises in The Report on the Practice of Kuwait, which noted that “[d]uring the “crisis” in February 1998, the Kuwaiti authorities deemed the border area a possible theatre of military operations and evacuated civilians from the vicinity.”<sup>15</sup>

Thus, the terms ‘theatre of warfare’ or ‘theatre of operations’ appear to be synonymous to the area of active hostilities during a time of armed conflict. However, despite the reference to the terms in domestic military legal instruments and custom, there is no express universally accepted definition. The references to the domain of the ‘theatre of warfare’ are interpreted as the area in which active hostilities are occurring, which suggests that a ‘theatre of warfare’ may be determined in operational law as opposed to being expressly outlined in an IHL instrument. Discussion of what a ‘theatre of warfare’ or theatre of operations is for the purpose of this research is important as since 2019, NATO has recognised Outer Space as one of its “operational domains”.<sup>16</sup> This recognition by the military alliance of Outer Space as one of its environments of military operations alongside land, sea, air and cyber was a significant step in confirming the militarised nature of Outer Space. This escalation of the military nature of Outer Space, which is reserved for “peaceful purposes”<sup>17</sup> in the ISL framework, is indicative of the increased likelihood of armed conflict and weapons use in Outer Space.

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<sup>15</sup> ICRC International Humanitarian Law Databases, ‘Practice relating to Rule 24. Removal of Civilians and Civilian Objects from the Vicinity of Military Objectives’ <<https://ihl-databases.icrc.org/en/customary-ihl/v2/rule24?country=kw>> accessed 28 September 2023 referencing practices in Kuwait as reported in Report on the Practice of Kuwait (1997) Answers to additional questions on Chapter 1.7.

<sup>16</sup> NATO, ‘NATO’s Approach to Space’ (23 May 2023) <[https://www.nato.int/cps/en/natohq/topics\\_175419.htm](https://www.nato.int/cps/en/natohq/topics_175419.htm)> accessed 1 September 2023.

<sup>17</sup> 1967 Outer Space Treaty, preamble and art IV.

### 6.1.2 Operational Law

While IHL applies in times of armed conflict, it has been noted that the related area of operational military law has had to expand as militaries participate in “military operations other than war”.<sup>18</sup> The participation of armies in situations outside of those of active armed hostilities means that “leadership requires advisors who focus on concomitant political, military, and legal issues.”<sup>19</sup> The law that outlines the activities of militaries, during and outside of active activities, known as operational law, takes into consideration IHL, but also the policy and political motivations behind the operations.

The definition of operational law describes it as “that body of law, both domestic and international, impacting upon legal issues associated with the planning for and deployment of ...[f]orces oversees in both peacetime and combat environments.”<sup>20</sup> As a “collection of all of the traditional areas of the military legal practice focused on military operations”,<sup>21</sup> operational law likely outlines the domain in which these operations will occur and thus, it is operational law that will outline what is the ‘theatre of warfare’.

The Operational Law Handbook is drafted by the National Security Law Department in Charlottesville, Virginia in the United States. It’s aim is to provide “a “how to” guide for Judge Advocates practicing national security law”.<sup>22</sup> This handbook outlines the recognised operational domains of land, sea and airspace (similar to those of NATO) as consisting of areas on

“[t]he Earth’s surface, sub-surface, and atmosphere [which] are broadly divided into National and International areas. For operational purposes, international waters and airspace...include all areas not subject to the territorial sovereignty of any nation. All

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<sup>18</sup> Marc L Warren, ‘Operational Law – A Concept Matures’ (1996) 152 Military Law Review 33, 34.

<sup>19</sup> Ibid 35.

<sup>20</sup> Lieutenant Colonel David E Graham, ‘Operational Law (OPLAW) – A Concept Comes of Age (1987) Army Law 9.

<sup>21</sup> Marc L Warren, ‘Operational Law – A Concept Matures’ (1996) 152 Military Law Review 33, 37.

<sup>22</sup> Major Micah Smith (ed), *Operational Law Handbook 2022* (2022) < [https://tile.loc.gov/storage-services/service/ll/mlmp/operations-law-handbook\\_2022/operations-law-handbook\\_2022.pdf](https://tile.loc.gov/storage-services/service/ll/mlmp/operations-law-handbook_2022/operations-law-handbook_2022.pdf)> accessed 11 September 2023, ii.

waters and airspace seaward of the territorial sea are international areas in which the high seas freedoms of navigation and overflight are preserved to the international community.”<sup>23</sup>

The Handbook similarly recognises the operational domain of cyberspace, which is different from the other geographic domains because “cyberspace is wholly contained within the information environment”.<sup>24</sup> In the Handbook, Outer Space is dealt with as a domain for operations the same as the air and sea domains.<sup>25</sup> While the Operational Law Handbook references the geographic domains which can constitute ‘theatres of warfare’, the designation of this theatre varies on a case-by-case basis depending on the operation. Nevertheless, the Outer Space domain is recognised as a possible domain for military operations and the militarised nature of the domain is recognised.<sup>26</sup> This highlights the increasingly militarised nature of Outer Space, the possibility for military operations to occur there and in those operations, the possibility for weapons use – the focus of this research.

The implementation of military strategies in operations is described as planning “military unified action within a geographic region to achieve strategic goals.”<sup>27</sup> The geographic region in which this action occurs constitutes a military theatre or a ‘theatre of war’ and is specified, along with details of the operations and how they are to be implemented, in the rules of engagement (ROEs) of each party involved in a specific operation. The recognition of Outer Space as a region in which the conduct of hostilities are to occur is not only representative of the militarised nature of Outer Space, but also indicates that the use of weapons, which could occur during armed conflict, could also occur in this

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<sup>23</sup> Major Micah Smith (ed), *Operational Law Handbook 2022* (2022) < [https://tile.loc.gov/storage-services/service/l1/llmlp/operations-law-handbook\\_2022/operations-law-handbook\\_2022.pdf](https://tile.loc.gov/storage-services/service/l1/llmlp/operations-law-handbook_2022/operations-law-handbook_2022.pdf) > accessed 11 September 2023, 237.

<sup>24</sup> Ibid 217.

<sup>25</sup> Ibid 235: “sea, air & outer space operations”.

<sup>26</sup> Ibid 256.

<sup>27</sup> Clarence J Bouchat, ‘An Introduction to Theater Strategy and Regional Security’ (2007) Army War College Strategic Studies Institute Carlisle Barracks <<https://apps.dtic.mil/sti/citations/ADA470925> > accessed 7 December 2020, 3.

environment. The recognition of the prospect of weapons use in the environment of Outer Space, which is becoming closer to reality, as this chapter discusses, highlights the need to address the gap in the current legal regime that applies to weapons in Outer Space.

### **6.1.3 Rules of Engagement**

ROEs are the “rules governing the use of force and actions which can (potentially) influence or regulate the escalation of the use of force or hostilities in the area of operations.”<sup>28</sup> Therefore, the rules of engagement determine what can occur within a ‘area of operations’ or a ‘theatre of warfare’ and for example, could define what a ‘theatre of warfare’/an area of operations were to be in Outer Space if military operations were to occur in Outer Space. ROEs vary due to the specific nature of an operation to be implemented by a State in a specific armed conflict scenario. However, ROEs, while specific and not available in the public domain, are relevant to the concept of the ‘theatre of warfare’ because the purpose of ROEs “is to control actions and behaviour which (directly) relate to or influence the behaviour of (potential) hostile forces and thereby (attempt to) maintain control over, or influence, the overall conduct of the parties and the use of force in the theatre of operations.”<sup>29</sup> ROEs define what will occur within a ‘theatre of warfare’ and as a result, will outline what this theatre is in a given armed conflict situation. Therefore, if an armed conflict were to occur in Outer Space, a party to a conflict may have ROEs which outline what actions are to be carried out in specific operations and where in Outer Space these operations are to be carried out. In doing so, the ROEs

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<sup>28</sup> JFR Boddens Hosang, ‘Rules of Engagement and the International Law of Military Operations’ (2020) (Oxford Scholarship Online) < <https://oxford-universitypressscholarship-com.jproxy.nuim.ie/view/10.1093/oso/9780198853886.001.0001/oso-9780198853886-chapter-2> > accessed 18 December 2020.

<sup>29</sup> Ibid.

would define where in Outer Space is being considered as the ‘theatre of warfare’ for the operations of a party to the armed conflict.

As already noted, operational law extends beyond considerations based purely on IHL and thus, ROEs, and their respective definition of ‘theatre of warfare’, “reflect the influence of operational, political, and diplomatic factors.”<sup>30</sup> In addition, ROEs will align not only with IHL, but also with the domestic law of the State whose military is implementing it.<sup>31</sup> While a ‘theatre of warfare’ will therefore be defined by a State domestically in their military ROE for a specific conflict or operation, Hosang notes that modern rules of engagement include “such rules as evidenced inter alia by the (operational) practices and doctrines of the North Atlantic Treaty Organization (NATO)”,<sup>32</sup> among other regional and international organisations. This would suggest that a given ‘theatre of warfare’ as outlined in a State’s ROE would draw its definition and limitations from NATO’s list of operational domains – one of which, as the following sub-section discusses, is Outer Space. Therefore, NATO’s recognition of Outer Space as one of its ‘operational domains’ informs the ROEs of parties engaging in armed conflicts and in doing so, could even be considered as legitimising the status of Outer Space as a prospective ‘theatre of warfare’ for States if there are to draw their guidance for operational rules from the organisation.

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<sup>30</sup> J. Ashley Roach, ‘Rules of Engagement’ (1983) 36 *Naval College War Review* 46.

<sup>31</sup> *Ibid* 51.

<sup>32</sup> JFR Boddens Hosang, ‘Rules of Engagement and the International Law of Military Operations’ (2020) (Oxford Scholarship Online) < <https://oxford-universitypressscholarship-com.jproxy.nuim.ie/view/10.1093/oso/9780198853886.001.0001/oso-9780198853886-chapter-2>> accessed 18 December 2020.

#### 6.1.4 NATO's Development of its Operational Domains

Since it was formed in 1949, NATO aimed to function as an alliance with defensive and deterrence capabilities in the conventional domains of warfare that were land, air and sea. However, as the militaries of its allied States and their adversaries began to develop new weapons and military technologies that could expand the realms in which conflicts could occur, NATO came under pressure to maintain its relevance with the States party to its alliance. An example of this was witnessed “[i]n 2002, [when] NATO began institutionalizing new capabilities and expertise so that it could rapidly address CBRN threats”,<sup>33</sup> with CBRN referring to chemical, biological, radiological and nuclear threats arising at the time. This proactive work by NATO to expand its competencies to align with the military challenges being faced by States provided “useful insights for future alliance work in the cyber domain.”<sup>34</sup>

This “precedent for alliance evolution”<sup>35</sup> was seen in June 2016 when “NATO ministerial recognized cyberspace as an operational domain...and agreed to a military vision and strategy for cyberspace operations.”<sup>36</sup> This addition to the list of operational domains by NATO constituted an effort “to adapt to keep [their] edge.... [and] integrate all domain efforts across the entire battlespace.”<sup>37</sup>

While NATO's categorisation of cyberspace as an ‘operational domain’ in 2016 could have been interpreted as a declaration of war in “an entirely novel war-fighting domain - a new manmade theatre of war”,<sup>38</sup> it appears that it was merely a response to the trend

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<sup>33</sup> Lillian Albon, Anika Binnedijk et al, ‘Operationalizing Cyberspace as a Military Domain’ (2019) Perspective Expert Insights on a Timely Policy Issue 1, 3.

<sup>34</sup> Ibid.

<sup>35</sup> Ibid 8.

<sup>36</sup> Ibid.

<sup>37</sup> James G Foggo and Alarik Fritz, ‘X. NATO and the Challenge in the North Atlantic and the Arctic’ (2018) 93(1) Whitehall Papers 121, 126.

<sup>38</sup> Robin Geib, ‘War and Law in Cyberspace’ (2010) American Society of International Law Proceedings of Annual Meeting 371.

that was already evident among its allied States. These same sentiments were those expressed in the London Declaration in 2019 when Outer Space became an operational domain. It was highlighted that the rationale behind this decision was that “[t]o stay secure, we must look to the future together.”<sup>39</sup> It was thus declared that “space [is] an operational domain for NATO, recognising its importance in keeping us safe and tackling security challenges”<sup>40</sup>

Outer Space is a domain unlike the others with regards to military operations and how objects, including weapons, operate in Outer Space. While airspace has been a domain of military operations via use of aerial vehicles, Outer Space has yet to witness such activity. Airspace, defined in Article 1 of the 1919 Paris Convention as being under the “complete and exclusive sovereignty”<sup>41</sup> of the State over whose territory it exists. However, despite the proximity of the two domains, in the law of airspace, “[t]here is no precise definition of where the boundary of air space lies in relation to outer space”.<sup>42</sup> Despite the lack of legal certainty with regards to the delimitation between the two, the technologies that operate in both are noted as different. Lal and Nightingale note that:

“[a]ir involves flight by either aerostatics (balloons and airships) or aerodynamic lifting surfaces such as wings and rotors (airplanes, sailplanes, and helicopters). Space involves flight by rocket-boosted vehicles whose flight paths are governed by ballistics and orbital mechanics.”<sup>43</sup>

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<sup>39</sup> NATO, ‘The London Declaration: Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in London 3-4 December 2019’ (4 December 2019) Press Release 115 <[https://www.nato.int/cps/en/natohq/official\\_texts\\_171584.htm](https://www.nato.int/cps/en/natohq/official_texts_171584.htm)> accessed 28 September 2023, para 6.

<sup>40</sup> Ibid.

<sup>41</sup> Convention relating to the regulation of Aerial Navigation (with additional Protocol), signed at Paris, October 13, 1919 (adopted 13 October 1919, entered into force 29 March 2022) LNTS 11, p173 (1919 Paris Convention), art 1.

<sup>42</sup> Alexandra Harris and Ray Harris, ‘The need for air space and outer space demarcation’ (2006) 22 Space Policy 3, 4.

<sup>43</sup> Bhavya Lal and Emily Nightingale, ‘Where is Space? And Why Does That Matter?’ (2014) Space Traffic Management Conference 16 <<https://commons.erau.edu/cgi/viewcontent.cgi?article=1052&context=stm>> 1-2.

The difference in technologies needed to operate in airspace and Outer Space illustrate the different considerations that apply, including in viewing them as operational domains. Outer Space requires considerations of orbital mechanics for example, because objects are in orbit in Outer Space. This must be considered in undertaking and regulating military operations in Outer Space as weapons use could result in orbital debris which could start a domino effect of collisions between debris, space objects and space junk and result in the Kessler Syndrome.<sup>44</sup> This is a characteristic that illustrates Outer Space as a unique domain that warrants its recognition, and in the case of this research, its regulation, distinct from airspace.

While NATO's declaration of Outer Space as an 'operational domain' solidified the possibility that Outer Space could serve as a 'theatre of warfare' in which military operations and armed hostilities could occur, it was likely a reaction by NATO to the evolving Space capacities of its allied States. Foggo and Fritz highlighted that NATO attributes its success and continued existence to "the fundamental strengths of our Alliance as a partnership of forces...our common resolve; and...adopting new strategies and adaptations."<sup>45</sup> In order to maintain cooperation within its partnership, NATO's priorities must adapt to continue to align with those of its allied States and the categorization of Outer Space as an operational domain is illustrative of this.

The actions of some NATO States could be argued to demonstrate a view that Outer Space already constitutes a 'theatre of warfare' – such as the United States or France developing domestic Outer Space military branches, in 2019 and 2020 respectfully.<sup>46</sup> However,

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<sup>44</sup> Bohumil Doboš and Jakub Pražák, 'Master spoiler: a strategic value of Kessler Syndrome' (2022) 22(1) *Defence Studies* 123.

<sup>45</sup> James G Foggo & Alarik Fritz, 'X. NATO and the Challenge in the North Atlantic and the Arctic' (2018) 93(1) *Whitehall Papers* 121, 125.

<sup>46</sup> United States Space Force, 'About the Space Force' < <https://www.spaceforce.mil/> > accessed 18 August 2023; Vivienne Machi, 'Six questions with France's Air and Space Force chief' (*Defense News*, 15 June 2023) < <https://www.defensenews.com/interviews/2023/06/15/six-questions-with-frances-air-and-space-force-chief/> > accessed 18 August 2023. See also Christian Mackenzie, 'French Air Force changes name as

NATO Secretary General Jens Stoltenberg emphasised in November 2019 that “[w]e are a defensive Alliance. And our approach will remain fully in line with international law. But making space an operational domain will help us ensure that all aspects are taken into account to ensure the success of our missions”.<sup>47</sup>

Thus, NATO’s addition of Outer Space to its list of operational domains was not envisaged as creating a new ‘theatre of warfare’ whereby States would utilise Outer Space in military operations or eventually in armed conflicts. However, as the following sections analysing space security, the militarisation of the Outer Space environment, potential space weapons, and the various actors involved in Outer Space activities will illustrate; the prospect of Outer Space becoming a ‘theatre of warfare’ is growing near. This reality of the nature of the Outer Space environment is central to this research as it increases the likelihood of the use of weapons in Outer Space – use which would likely be unregulated with the gaps in the space law framework with respect to weapons, as shown in Chapter 5. Thus, while it has been seen that a ‘theatre of warfare’ may not be strictly defined, the reality is that it is a domain in which military operations are conducted. The use of kinetic weapons may have not yet occurred in the Outer Space environment, as Section 6.6 illustrates, but militarised operations have occurred in Outer Space for a significant period of time.

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it looks to the stars’ (Defense News, 15 September 2020) <<https://www.defensenews.com/global/europe/2020/09/15/french-air-force-changes-name-as-it-looks-to-the-stars/>> accessed 13 September 2023.

<sup>47</sup> NATO Secretary General Jens Stoltenberg, Press Conference following the meeting of the North Atlantic Council at the level of Foreign Ministers (Brussels 20 November 2019) <[https://www.nato.int/cps/en/natohq/opinions\\_171022.htm](https://www.nato.int/cps/en/natohq/opinions_171022.htm)> accessed 18 December 2020.

## 6.2 Implication of Outer Space Being Defined as a ‘Theatre of Warfare’

While, as is discussed in the previous section, there is no express definition of a ‘theatre of warfare’ nor does NATO promote warfare in Outer Space when categorizing the environment as an ‘operational domain’, there are potential implications from the definition. Primarily, it may be interpreted by States that have favoured military uses of Outer Space to attempt to gain the military advantage of Outer Space, which, as discussed below, presents the ultimate military high-ground. Thompson, Gagnon and McLeod emphasise that the “new space war-fighting construct is based on the reality that the control of space provides a military advantage and, therefore, it is a contested war-fighting domain.”<sup>48</sup> The US is the central example of a State that views Outer Space as a ‘theatre of warfare’ already. King and Blank note that in accordance with directives from the Department of Defence, “[t]he U.S. applies LOAC to all military operations in outer space—space is a warfighting domain, where military members conduct military operations”,<sup>49</sup> illustrating the overlap between the two areas of law on which this research focuses and thus, the necessity to investigate both.

It is further noted that while “U.S. partners—NATO states, Australia, and Japan—do not necessarily have similarly clear articulations”<sup>50</sup> as those outlined by the US Department of Defence, it is this categorization by the United States of Outer Space as a war-fighting domain that likely spurred NATO’s decision to adopt a similar categorization in the aim of ensuring that the alliance remains relevant to the military practices of one of its strongest military allies. Thus, while the preparedness for an armed conflict in Outer

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<sup>48</sup> Lt Gen David Thompson, Col Gregory J Gagnon and Maj Christopher McLeod, ‘Space as a War-fighting Domain’ (2018) *Air & Space Power Journal* 4, 6.

<sup>49</sup> Matthew T. King & Laurie R. Blank, ‘International Law and Security in Outer Space: Now and Tomorrow’ (2019) 113 *American Journal of International Law Unbound* <<https://www.cambridge.org/core/journals/american-journal-of-international-law/article/international-law-and-security-in-outer-space-now-and-tomorrow/2591D90C09C4A9375DE81F750DA98DDE>> accessed 19 December 2020, 127.

<sup>50</sup> *Ibid* 128.

Space is not necessarily present with all NATO allies, the priorities of the US in Outer Space have become the priorities of NATO.

This research contends that the allocation of the title of ‘operational domain’ to Outer Space by NATO serves as a declaration to other Space Powers that the US have the capacity to defend a war in Outer Space and while it is recognised that “[t]he US does not want to see a war that extends to space because nobody wins that war”,<sup>51</sup> it is also noted that the US “cannot ignore the capabilities and stated intent of potential adversaries.”<sup>52</sup> As a result, there are reasonable fears that NATO’s categorization may be interpreted as an invitation to adversaries to attempt to extend conflicts into Outer Space more than already – essentially, crossing the threshold from militarisation to weaponisation, discussed later in this chapter. This prospect of the placement and use of weapons in Outer Space illustrates the need to address the gap in the IHL and ISL frameworks with respect to the use of weapons in Outer Space.

However, this research highlights that as opposed to an invitation to war, the US have taken the stance of reacting to the capacities that its adversaries possess. Thus, while NATO’s categorization of operational domain may have been a response to US space priorities, the escalated US military space priorities constitute a response to the escalated environment of Outer Space as a whole. Nasu notes that “[t]he United States and its allies are suspicious that states will engage in covert development of hostile space capabilities...China and Russia are known to have been experimenting with, and even developing, various anti-satellite capabilities”.<sup>53</sup> In addition to these well-developed

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<sup>51</sup> Lt Gen David Thompson, Col Gregory J Gagnon and Maj Christopher McLeod, ‘Space as a War-fighting Domain’ (2018) *Air & Space Power Journal* 4, 6.

<sup>52</sup> *Ibid.*

<sup>53</sup> Hitoshi Nasu, ‘NATO Recognizes Space as an ‘Operational Domain’: One Small Step Towards a Rules-Based International Order in Outer Space’ (4 March 2020) *Just Security* <<https://www.justsecurity.org/68898/nato-recognizes-space-as-an-operational-domain-one-small-step-toward-a-rules-based-international-order-in-outer-space/>> accessed 19 December 2020.

Space Powers, King and Blank emphasise that “outer space has exploded with new actors...[n]ew actors and activities bring new potential threats and concerns for new and existing actors alike.”<sup>54</sup> The rise of private actors, but also new State actors, such as India, in Outer Space creates more competition in the environment to establish themselves as a legitimate new Space Power, which escalates tensions between all Space actors. These Space actors are analysed later in this chapter.

This escalation from militarisation to the precipice of weaponisation at which Outer Space currently sits, as this chapter establishes, has created a tense environment in Outer Space. The addition of more actors, with increased funding and sophisticated technologies presents a significant challenge to the US, for example, as the front-runner in Outer Space activities. Thus, the definition of Outer Space as a ‘theatre of warfare’ may constitute a recognition of the reality being faced by humankind and the real prospect of State-based tensions playing out in an armed conflict in Outer Space. This research emphasises that in such a scenario, where weapons use may occur, it is humankind as a whole that face the consequences of unnecessary suffering.

However, while the negative implications of categorising Outer Space as an ‘operational domain’ and a ‘theatre of warfare’ are at the forefront of fears for Space security, Nasu interprets the situation as an opportunity for regulation to be created before Outer Space’s ‘theatre of warfare’ is ever utilised, recommendations for which are the focus of this research. It is highlighted that consensus at a UN level has not been reached for regulation of armed hostilities specifically in Outer Space because, similar to the regulation of conflicts in “cyberspace, the primary obstacle to progress is distrust among the key

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<sup>54</sup> Matthew T. King & Laurie R. Blank, ‘International Law and Security in Outer Space: Now and Tomorrow’ (2019) 113 *American Journal of International Law Unbound* <<https://www.cambridge.org/core/journals/american-journal-of-international-law/article/international-law-and-security-in-outer-space-now-and-tomorrow/2591D90C09C4A9375DE81F750DA98DDE>> accessed 19 December 2020, 125.

players.”<sup>55</sup> The recognition of this distrust and tensions that have resulted in this ‘theatre of warfare’ must thus be utilised as a catalyst for regulation. If Outer Space is to constitute an operational domain, “the effectiveness of military operations in space rely, as they do in the terrestrial domain, on the development of robust ‘rules of the game,’ especially rules grounded in the international law of armed conflict”,<sup>56</sup> which is why the establishment of the context of the ‘theatre of warfare’ that is Outer Space in this chapter is central for this research.

The creation of regulation for military operations and the use of weapons in Outer Space has, as Nasu notes, “never been more acute”,<sup>57</sup> as it is in the interests of States seeking to use Outer Space as a ‘theatre of warfare’ to know the limitations on their actions and the actions of their adversaries; as well as in the interests of humankind as a whole to curb potential consequences. While the categorization of Outer Space as an operational domain by NATO, and essentially, as a ‘theatre of warfare’, confirms the fears that militarisation has almost reached the event of weaponisation; there is also an opportunity for international cooperation and legislative response, recommendations for which are formed from the perspective of the principle of humanity in IHL in this research. These recommendations are formed because this research argues that if Outer Space is to be a ‘theatre of warfare’, specific IHL regulations must be created to respond to the gap in the existing legal frameworks, which had not imagined this occurrence. In order to form recommendations specific to the ‘theatre of warfare’ that is Outer Space, this chapter depicts the characteristics and militarised nature of Outer Space in the following sections.

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<sup>55</sup> Hitoshi Nasu, ‘NATO Recognizes Space as an ‘Operational Domain’: One Small Step Towards a Rules-Based International Order in Outer Space’ (4 March 2020) Just Security <<https://www.justsecurity.org/68898/nato-recognizes-space-as-an-operational-domain-one-small-step-toward-a-rules-based-international-order-in-outer-space/>> accessed 19 December 2020.

<sup>56</sup> Ibid.

<sup>57</sup> Ibid.

### 6.3 Space Security

The development of Outer Space as a ‘theatre of warfare’, while growing in tandem with the concept of space security, could pose challenge to the maintenance of the latter. As this section will outline, maintenance of space security is in the general interests of States and humankind and thus, will necessitate the introduction of protections as Outer Space continues to develop as a ‘theatre of warfare’. This research highlights that an area that requires attention in order to maintain Space security is the gap that exists in the ISL and IHL frameworks with regards to the use of weapons in Outer Space. With only the placement of nuclear weapons and weapons of mass destruction in Outer Space expressly prohibited,<sup>58</sup> the aforementioned gap allows for the use of weapons in Outer Space without being specifically regulated in a legal instrument. This research recommends the introduction of regulation of weapons use in Outer Space from the perspective of the principle of humanity in IHL, which Chapter 2 of this research describes.

Paladini notes that “space security presents two components: one, security from space, i.e. use and activities carried out in space for security purposes on Earth, and the other security in space, which aims at maintaining outer space according to the provisions of OST, i.e. as a safe, sustainable and stable environment for all countries.”<sup>59</sup> The maintenance of security in space is essential to provide for the continued functioning of activities falling under the category of security from space. Therefore, while security from space activities contribute towards the militarisation of Outer Space, a further escalation of this trend towards weaponisation could put these activities, such as the use of satellites for military reconnaissance, at risk.

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<sup>58</sup> 1967 Outer Space Treaty, art IV.

<sup>59</sup> Stefania Paladini, *The New Frontiers of Space: Economic Implications, Security Issues and Evolving Scenarios* (Palgrave Macmillan 2019) 155.

It is also in the interests of civilians to maintain security in Space, because as Pellegrino and Stang highlight “a day without fully functioning space capabilities would severely restrict or even endanger our lives.”<sup>60</sup> Humankind has grown dependant on Outer Space activities for everyday functions such as “running energy grids and telecommunication networks, border and maritime surveillance, crisis management and humanitarian operations, environmental and climate monitoring, verification of international treaties and arms control agreements, and the fight against organised crime and terrorism.”<sup>61</sup> Therefore, the maintenance of security in Space is essential in the interests of maintaining the functioning of civilian life on Earth and this alignment of interests between security in Space and civilian needs will persist as “[r]eliance on space is likely to increase further as space capabilities and services improve in diversity, quality and affordability.”<sup>62</sup> The need for security in Space for the everyday functioning of humankind highlights the need for the regulation of the use of weapons in Outer Space. The use of weapons in Outer Space poses a risk to satellites and the aforementioned Earth-based activities that satellites and satellite-information facilitates. Thus, regulation located at the intersection of ISL and IHL is required to place limitations on weapons use in Outer Space and this research recommends such regulation from the perspective of the principle of humanity. As Chapter 2 demonstrates, the definition that this research adopts for the principle of humanity focuses on the IHL considerations of reduction of unnecessary suffering and superfluous injury, which is likely to occur from the dissolution of Space security. It is for this reason that the recommendations for regulation that this research forms are guided by this principle.

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<sup>60</sup> Massimo Pellegrino and Gerald Stang, *Space Security for Europe* (Institute for Security Studies 2016) 21.

<sup>61</sup> Ibid.

<sup>62</sup> Ibid 22.

While the maintenance of security in Outer Space is favourable, it is a difficult aim to establish, let alone achieve, with Pellegrino and Stang emphasising the challenge posed in attempting to pursue “effective cooperation internationally, with each state prioritising different goals and means of managing their infrastructure dependence and sovereignty choices.”<sup>63</sup> While security in space would be of benefit to civilian populations, as well as the States actors availing of security activities from space, the benefits that could be gained by a State in weaponising and obtaining the ultimate military advantage by securing control over the high ground that is Outer Space, as is discussed further in Section 6.7, will be prioritised by many States and other space actors. The lure of weaponisation for a Space-faring State is further escalated by the prospect of another State or Space actor gaining military advantage in Outer Space first. In its 2016 Space Strategy for Europe,<sup>64</sup> the European Commission recognised that “Space is becoming a more contested and challenged environment. New competitors — both public and private — are emerging around the world”,<sup>65</sup> with this heightened competition driving the prospect of weaponisation forward in the security interests of individual States as opposed to international security interests.

Furthermore, national and regional security interests with respect to Outer Space have gained priority in recent times. In the same Space Strategy for Europe,<sup>66</sup> the Commission, while referencing the need for the European Community to assist in maintaining and contributing to international cooperation in the realm of Outer Space,<sup>67</sup> emphasised that “Europe must draw on its assets and use space capacities to meet the security and safety

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<sup>63</sup> Ibid 28.

<sup>64</sup> European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Space Strategy for Europe (26 October 2016 Brussels) COM (2016) 705 final.

<sup>65</sup> Ibid p. 8.

<sup>66</sup> Ibid.

<sup>67</sup> Ibid p. 11.

needs of the Member States”.<sup>68</sup> However, the security interests of many member States will inevitably conflict, with some European States aligning with the trail blazed by the US in establishing a military Space Force, as noted with regards to France.<sup>69</sup> Thus, while Space security is being made a priority, this could be balanced by States with possible advantages that could be gained for their State from militarised or weaponised activity in Outer Space. The possible harm in Outer Space and on Earth that could be caused should States opt for weapons use in Outer Space could be mitigated against through addressing the existing gap in the legal frameworks of ISL and IHL that regulate the use of weapons in Outer Space.

While increasing the priority of the national security interests may not currently pose a threat to the security in Outer Space, the competing security interests has the potential to give rise to conflict which could push militarisation over the precipice, resulting in weaponisation. This threat of weaponisation, which we will investigate in Section 6.4, inevitably poses a risk to space security; one which can only be effectively mitigated against with the introduction of pre-emptive weapons regulation legislation, recommendations for which this research will form.

#### **6.4 Militarisation versus Weaponisation**

Ramey emphasises that “the history of mankind’s ascent to space is a history of the militarization of outer space”.<sup>70</sup> Thus, when analysing the development of Outer Space

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<sup>68</sup> European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Space Strategy for Europe (26 October 2016 Brussels) COM (2016) 705 final p. 8.

<sup>69</sup> See also Christian Mackenzie, ‘French Air Force changes name as it looks to the stars’ (Defense News, 15 September 2020) <<https://www.defensenews.com/global/europe/2020/09/15/french-air-force-changes-name-as-it-looks-to-the-stars/>> accessed 13 September 2023.

<sup>70</sup> Robert A. Ramey, ‘Armed Conflict on the Final Frontier: The Law of War in Space’ (2000) 48 Air Force Law Review 1, 6.

as a ‘theatre of warfare’ it is important to note that weaponisation has yet to occur.<sup>71</sup> The ‘theatre of warfare’ that is Outer Space is currently a militarised environment, but recent developments indicate that the prospect of weaponisation is rapidly becoming a reality. As Freeland notes, our current interaction with Outer Space “represents a reflection of the relatively early stages of our adventures.... there is more that is yet to be attempted.”<sup>72</sup> It is this threat posed by future attempts, which could involve weaponisation, and the pace with which militarisation escalates towards these situations, which necessitates the introduction of weapons regulation.

Su describes militarisation in the context of Outer Space as the utilisation of “assets based in space to enhance the military effectiveness of conventional forces or the use of space assets for military purposes”.<sup>73</sup> This use constitutes what was described in Chapter 6 as ‘non-aggressive’ uses which comply with the prohibition on the threat or use of force in Art 2(4) of the UN Charter.<sup>74</sup> Militarisation activities include, among others, activities such as the use of “military communications satellites, GPS, radar, imaging and research, or orbiting armament forces and systems...setting up specialized military structures such as ‘Space Forces’ for the purpose of ‘conquering space’.”<sup>75</sup> In contrast, weaponisation focuses on “weapons based in space or...on the ground with their intended targets”<sup>76</sup>

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<sup>71</sup> Cassandra Steer, ‘Global Commons, Cosmic Commons: Implications of Military and Security Uses of Outer Space’ (2017) 18(1) *Georgetown Journal of International Affairs* 9, 11 it is noted with regards to Earth-to-Space ASAT weapons use that “to date these have all been launched from Earth (ground, sea, or air), and do not amount to weaponization of space”.

<sup>72</sup> Steven Freeland, ‘Peaceful Purposes – Governing the Military Uses of Outer Space’ (2016) 18(1) *European Journal of Law Reform* 35, 36.

<sup>73</sup> Jinyuan Su, ‘Use of Outer Space for Peaceful Purposes: Non-Militarization, Non-Aggression and Prevention of Weaponization’ (2010) 36(1) *Journal of Space Law* 253, 255.

<sup>74</sup> 1945 Charter of the United Nations, art 2(4).

<sup>75</sup> Valentin Becheru and Adrian Stan, ‘Humanity, from Peaceful Exploration of Outer Space to Its Conquest through Space Forces, Anti-Satellite Weapons and State of the Art Space Technologies’ (2019) 11(1) *Annals – Series on Military Sciences* 68, 79. See also Fabio Tronchetti, ‘Legal Aspects of the Military Uses of Outer Space’ in Frans von der Dunk and Fabio Tronchetti (eds), *Handbook of Space Law* (Edward Elgar Publishing 2015) 333: “[c]urrently, space-based systems have become crucial to warfare, as they enable precise navigation, furnish real-time weather data, allow instantaneous global communications, warn of possible missile threats, collect intelligence and carry out surveillance and reconnaissance.”

<sup>76</sup> Jinyuan Su, ‘Use of Outer Space for Peaceful Purposes: Non-Militarization, Non-Aggression and Prevention of Weaponization’ (2010) 36(1) *Journal of Space Law* 253, 265.

located in Outer Space. The militarisation of Outer Space has been gradually occurring since the launch of Sputnik I in 1957. However, this gradual acceptance of an increase in the amount and variety of uses of Space assets for military purposes has propped the door open for the eventual weaponisation of Outer Space, should pre-emptive regulation not be introduced. This is a growing concern because while the weaponisation of Outer Space has yet to occur, the testing of ASAT and anti-ballistic missiles in the past illustrate that weapons technology development has already reached the sophistication necessary to place weapons in Outer Space, as outlined in the timeline in Section 6.5. The kinetic ‘Space weapons’ of direct-ascent and co-orbital ASAT weapons are discussed in Section 6.6.

### **6.5 Timeline of Outer Space as a ‘Theatre of Warfare’**

While NATO’s 2019 announcement<sup>77</sup> that Outer Space would constitute the organisation’s latest ‘operational domain’ of military activities served as a declaration of Outer Space’s status as a ‘theatre of warfare’, Outer Space has been subject to militarised activities since the beginning of the ‘Space Age’. It is the escalation of militarised activities from this nascent period of humankind’s interaction with Outer Space to the modern ‘theatre of warfare’, which this timeline will denote. The increasingly militarised environment that this section illustrates will highlight the need to address weapons use in this environment with regulation. The increase in militarisation and demonstration of States attitudes towards Outer Space as a ‘theatre of warfare’ indicates that weaponisation and weapons use in Outer Space that is growing nearer. As this research shows, there is

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<sup>77</sup> NATO, ‘The London Declaration: Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in London 3-4 December 2019’ (4 December 2019) Press Release 115 < [https://www.nato.int/cps/en/natohq/official\\_texts\\_171584.htm](https://www.nato.int/cps/en/natohq/official_texts_171584.htm)> accessed 28 September 2023, para 6.

a gap in the ISL and IHL frameworks with regards to the regulation of this prospect of weapons use. As militarisation of the Outer Space environment increases, so too does the need to address the gap in the legal regime that applies to weapons regulation in Outer Space. This militarisation began from the beginning of humankind's activities in Outer Space, which was the launch of Sputnik I.

### **6.5.1 1957 – Sputnik**

Sputnik was the first manmade satellite launched into space, with the success being achieved by the USSR on 4<sup>th</sup> of October 1957. This initial movement of humankind into Outer Space immediately brought into question the law that applied to this previously undisturbed territory. As Freeland notes, Sputnik I “heralded the dawn of the space age, the space race (initially between the USSR and the United States), and the legal regulation of the use and exploration of outer space.”<sup>78</sup> This legal regulation came into existence in binding form 10 years later with the 1967 Outer Space Treaty,<sup>79</sup> but Sputnik I's launch also triggered the creation of customary international law.<sup>80</sup> Thus, while Sputnik “operated for only 92 days”,<sup>81</sup> it triggered significant legal change and also, significant reaction which resulted in the first signs of the militarisation of Outer Space.

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<sup>78</sup> Steven Freeland, ‘The Laws of War in Outer Space’ in Kai Uwe Schrogl et al (eds) *Handbook of Space Security* (Springer 2015) 82.

<sup>79</sup> 1967 Outer Space Treaty.

<sup>80</sup> As discussed in Chapter 6, Section 6.5, the launch and orbit of Sputnik resulted in the freedom of movement in Outer Space becoming an accepted practice, which formed custom. This was supported by Judge Lachs in *North Sea Continental Shelf Cases (Federal Republic of Germany v. Denmark; Federal Republic of Germany v. Netherlands)* [1969] ICJ Reports p.3. wherein it was stated that “[T]he first instruments that men sent into outer space traversed the air space of States and circled above them in outer space, yet the launching States sought no permission, nor did the other States protest. This is how the freedom of movement into outer space, and in it, came to be established and recognised as law within a remarkably short period of time.”

<sup>81</sup> Lev Zelenyi and Olga Zakutnyaya, ‘The ‘simplest satellite’ that opened up the universe: Sputnik 1 was launched 60 years ago to win a political space race, but its legacy is collaborative explorations far beyond Earth’ (2017) 105(5) *American Scientist* < <https://www.americanscientist.org/article/the-simplest-satellite-that-opened-up-the-universe>> accessed 19 November 2020.

While the USSR had originally intended to produce and launch a satellite “to carry scientific experiments with dedicated instruments”,<sup>82</sup> a project of this nature would not be completed by the launch date of 1957 and thus, the USSR scaled back the plans for Sputnik I. What resulted was “a small probe of a size of a ball (58 cm in diameter) and the weight of 83.6 kg”.<sup>83</sup>

However, despite its size and simplified function, Sputnik I was the catalyst that expediated humanity’s new level of interaction with Outer Space. In the midst of the USSR’s success with Sputnik I, the United States responded by committing “federal resources into the space race, and in 1958, Eisenhower started the man-in-space Project Mercury...[and] in the same year, NASA was established to look after the nation’s space endeavours”.<sup>84</sup> The race between the two primary ‘Space Powers’ had been accelerated by the launch of Sputnik I; a race to which many more States would eventually become parties. The technologies created during this period were significant science advancements. However, these advancements also held the possibility of military use.

Zelenyi and Zakutnyaya note that following on from the launch of Sputnik I came “the literal ‘sputniks’ (which is Russian for satellite)”,<sup>85</sup> heralding in the first stage of the militarisation of Outer Space through the launching of military satellites. The functions of these satellites ranged “from navigation, communications, meteorology and geodesy to reconnaissance and anti-satellite activities”.<sup>86</sup> Within these capabilities, reconnaissance on military operations and targets constituted a military capability. The increase in the use of these satellites resulted in what Jasani describes as the second stage of the

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<sup>82</sup> Ibid.

<sup>83</sup> Stefania Paladini, *The New Frontiers of Space: Economic Implications, Security Issues and Evolving Scenarios* (Palgrave Macmillan 2019) 13.

<sup>84</sup> Ibid.

<sup>85</sup> Lev Zelenyi and Olga Zakutnyaya, ‘The ‘simplest satellite’ that opened up the universe: Sputnik 1 was launched 60 years ago to win a political space race, but its legacy is collaborative explorations far beyond Earth’ (2017) 105(5) *American Scientist* < <https://www.americanscientist.org/article/the-simplest-satellite-that-opened-up-the-universe>> accessed 19 November 2020.

<sup>86</sup> Bhupendre Jasani, ‘Outer Space Being Turned into a Battlefield’ (1986) 17(1) *Bulletin of Peace Proposals* 29.

militarisation of Outer Space involving “the development and testing of weapons which could damage or destroy these satellites.”<sup>87</sup>

### **6.5.2 1958 – High Altitude Nuclear Detonation**

These nuclear weapons “affect the operations of applications that utilize outer space and the Earth’s atmosphere”<sup>88</sup> and were tested at high altitude in Outer Space by both the USSR and the US during the Cold War period. The prospect of these weapons was discovered by USSR scientists while investigating anti-ballistic missile (ABM) systems in the late 1950s. They realised that “nuclear-tipped ABMs would generate highly dangerous blast effects and electromagnetic pulse radiation (EMP) in the surrounding atmosphere and on the very territory they were designed to protect.”<sup>89</sup> In order to monitor the extent of these effects, the USSR ‘K’ Tests were organised to investigate the impact of the detonation of nuclear ABMs would have in Outer Space.<sup>90</sup>

However, these first instances of testing the use of weapons in Outer Space resulted in what Ramey described as “a plea from the Soviet Union that such test does not endanger the safety of Soviet cosmonauts”<sup>91</sup> anymore, to which the United States agreed. The joint conclusion on the negative impact of nuclear tipped ABMs was outlined in the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (Limited Test Ban Treaty) 1963,<sup>92</sup> as is discussed in Chapter 6. Nevertheless, while the

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<sup>87</sup> Ibid 29.

<sup>88</sup> 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(2) *Journal of Space Law* 321, 327.

<sup>89</sup> Anatoly Zak, ‘The ‘K’ Project: Soviet Nuclear Tests in Space’ (2006) 13(1) *Non-proliferation Review* 143.

<sup>90</sup> See Ibid where it is stated that “[i]n December 1956, the leading Soviet nuclear physicist, Yuri Khariton, oversaw a test designated as “K” that proved the effectiveness of nuclear warheads for anti-missile applications”. It is also noted at 144 that “[a]s a byproduct, K experiments would also test the influence of high-altitude nuclear explosions on radio communications, as well as on various aviation and rocket hardware.”

<sup>91</sup> Robert A. Ramey, ‘Armed Conflict on the Final Frontier: The Law of War in Space’ (2000) 48 *Air Force Law Review* 1, 13.

<sup>92</sup> 1963 Limited Test Ban Treaty.

initial tests of weapons in Outer Space did not result in weaponisation of Outer Space, militarisation gained momentum and these tests paved the way for the ASAT missile tests witnessed in recent times in Outer Space. The realisation of a prospect close to the weaponisation of Outer Space was addressed in Article IV of the Outer Space Treaty 1967.<sup>93</sup>

### **6.5.3 1967 Outer Space Treaty<sup>94</sup>**

During the Space Race and Cold War period, it was the possibility of an escalated increase in the development and use of space devices for military purposes which led to the creation of 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.<sup>95</sup> As outlined in Chapter 6, Article IV of the Outer Space Treaty highlighted that “[t]he Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes”.<sup>96</sup> While this treaty attempted to reserve the use of Outer Space for purely peaceful purposes, the potential of Outer Space as a ‘theatre of warfare’ has nevertheless continued to increase significantly. As Jasani notes, the objective of keeping Outer Space as a peaceful zone merely ensured that “outer space has remained free from the deployment of nuclear weapons and any other weapons of mass destruction”,<sup>97</sup> as opposed to preventing the militarisation of Outer Space, which, as is discussed, continues through military satellite usage and the testing of anti-satellite weapons.<sup>98</sup>

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<sup>93</sup> 1967 Outer Space Treaty, art IV.

<sup>94</sup> Ibid.

<sup>95</sup> 1967 Outer Space Treaty.

<sup>96</sup> Ibid art IV.

<sup>97</sup> Bhupendre Jasani, ‘Outer Space Being Turned into a Battlefield’ (1986) 17(1) Bulletin of Peace Proposals 29.

<sup>98</sup> Ibid.

While the use of Outer Space for ‘peaceful purposes’ was the standard set for space activities in the 1967 Outer Space Treaty,<sup>99</sup> Freeland reflects on the fact that “it is now clear that space has now been utilized for military activities almost from the time of the very infancy of space activities”<sup>100</sup> and this standard did little to stem the momentum of the process of militarisation.

Thus, the provisions of the 1967 Outer Space Treaty, while it remains the foundational instrument in the Space Law framework today, prevented neither the increased militarisation of Outer Space, nor its potential weaponisation even though it banned the placement of weapons other than those of nuclear power or mass destruction into Outer Space.<sup>101</sup> This indicates that the militarisation of Outer Space, and weapons use, are not sufficiently dealt with in the 1967 Outer Space Treaty, or the broader ISL framework. As this research indicates, there is a gap with respect to weapons regulation in both the ISL and IHL frameworks in the environment of Outer Space. While the Outer Space Treaty remains the foundational instrument of ISL, it needs to be supported by a weapons regulation instrument in order to address this gap. This research forms recommendations for such an instrument and illustrates how the principle of humanity in IHL can be utilised to guide the formation of such recommendations for weapons regulation.

#### **6.5.4 1991 Persian Gulf War – First ‘Space War’<sup>102</sup>**

The 1991 Persian Gulf War (also known as Operation Desert Storm), the conflict aimed at liberating Kuwait from Iraqi occupation, is viewed as the United States’ first ‘Space

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<sup>99</sup> 1967 Outer Space Treaty, preamble and art IV.

<sup>100</sup> Steven Freeland, ‘The Laws of War in Outer Space’ in Kai Uwe Schrogl et al (eds) *Handbook of Space Security* (Springer 2015) 83.

<sup>101</sup> 1967 Outer Space Treaty, art IV.

<sup>102</sup> See John Burgess, ‘Satellites’ Gaze Provides New Look at War’ (The Washington Post, 19 February 1991) <<https://www.washingtonpost.com/archive/politics/1991/02/19/satellites-gaze-provides-new-look-at-war/768b19e4-a1da-4f40-8267-28a5dda48726/>> accessed 13 September 2023: “[t]he world’s first satellite war” is how Arthur C. Clarke, science-fiction writer and originator of the communications satellite concept, recently described the fighting in the Persian Gulf.”

War'. This is because the coalition entering the 1991 Persian Gulf War, which was led by US forces, was equipped with what Lambakis described as "a near-total dominance of Earth orbits and marshalled unprecedented space-dependent military capabilities".<sup>103</sup> In contrast, the Iraqi forces approached the conflict in a "conventional and outmoded"<sup>104</sup> fashion. Therefore, Desert Storm is the conflict that solidified use of Outer Space technology as a standard tactic in military operations and the evolution of warfare away from conventional methods.<sup>105</sup>

Throughout Desert Storm, "[a] variety of space assets from the civilian, commercial, and military sectors of the United States, Great Britain, France, and even the Soviet Union were available to the multinational coalition to support victorious air, land, and maritime operations."<sup>106</sup> Satellites were utilised to provide "reliable and near-total intra-theatre communications",<sup>107</sup> to navigate the armed troops through the desert and to survey the movements of Iraqi troops.<sup>108</sup> The coalition also arranged a "space imagery embargo against Iraq"<sup>109</sup> which prevented Iraqi forces obtaining information and evidence of the movements and positions of the coalition armed forces.

However, even though it was the first 'Space War', Lambakis notes that the "need for space denial in Desert Storm was not great"<sup>110</sup> because of the embargo against Iraq's use of Outer Space-based systems. This meant that the coalition forces did not have to combine cyber-warfare tactics such as jamming of satellite signals with their use of the

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<sup>103</sup> Steven Lambakis, 'Space control in Desert Storm and beyond' (1995) 39(3) ORBIS 417, 418.

<sup>104</sup> Ibid 418.

<sup>105</sup> See Dr Brian Weedon and Victoria Samson (eds), 'Global Counterspace Capabilities: An Open Source Assessment' (Secure World Foundation April 2023) <[https://swfound.org/media/207567/swf\\_global\\_counterspace\\_capabilities\\_2023\\_v2.pdf](https://swfound.org/media/207567/swf_global_counterspace_capabilities_2023_v2.pdf)> accessed 12 September 2023, 01-02: "[t]he U.S. military also has the most operational experience of any military in the world in integrating space capabilities into military operations, having done so in every conflict since the 1991 Persian Gulf War against Iraq."

<sup>106</sup> Steven Lambakis, 'Space control in Desert Storm and beyond' (1995) 39(3) ORBIS 417, 418.

<sup>107</sup> Ibid 419.

<sup>108</sup> Ibid 419.

<sup>109</sup> Ibid 421.

<sup>110</sup> Ibid 422.

Outer Space technology at their disposal, although they had the capacities to carry out these functions. Jamming of satellites is not prohibited in the ISL framework and it is being used in the on-going Russia-Ukraine conflict.<sup>111</sup> Steer and Stephens when referring to different ‘Space weapons’, including jamming, note that they “do not fall foul of any other specific weapons-based treaty or IHL treaty of general application.”<sup>112</sup> Thus if jamming would not have been prohibited if employed by coalition forces in that conflict. Nevertheless, in the midst of the important role of Outer Space technology in Operation Desert Storm, it was recognised that “in the future, space control will be as important as sea control or command of the air is today”.<sup>113</sup> The central role that Outer Space played in Desert Storm, and continues to play in armed conflicts today, illustrates how militarised Outer Space has become and how essential Space-based technology now is to States’ militaries. For example, while Operation Desert Storm may have been the first ‘Space War’ it is highlighted in the Centre for Strategic and International Studies 2023 Space Threat Assessment<sup>114</sup> that for some, the on-going Russia-Ukraine conflict constitutes ““the first commercial space war,” and it has highlighted areas where the use of commercial space capabilities has advanced ahead of policy, strategy, and concepts of operations”,<sup>115</sup> as it, among other things, involved the use of commercial satellites.<sup>116</sup>

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<sup>111</sup> Centre for Strategic and International Studies, ‘Space Threat Assessment 2023’ (April 2023) <[https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414\\_Bingen\\_Space\\_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ](https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414_Bingen_Space_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ) > accessed 12 September 2023, 18: “Russian employment of GPS-jamming devices has continued throughout the conflict.”

<sup>112</sup> Cassandra Steer and Dale Stephens ‘International Humanitarian Law and Its Application in Outer Space’ in Cassandra Steer and Matthew Hersch (eds), *War and Peace in Outer Space: Law, Policy, and Ethics* (Oxford University Press 2021) 29-30.

<sup>113</sup> Steven Lambakis, ‘Space control in Desert Storm and beyond’ (1995) 39(3) ORBIS 417, 427.

<sup>114</sup> Centre for Strategic and International Studies, ‘Space Threat Assessment 2023’ (April 2023) <[https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414\\_Bingen\\_Space\\_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ](https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414_Bingen_Space_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ)> accessed 27 September 2023.

<sup>115</sup> Ibid 1.

<sup>116</sup> Julia Siegel, ‘Commercial satellites are on the front lines of war today. Here’s what this means for the future of warfare.’ (30 August 2022, Atlantic Council) < <https://www.atlanticcouncil.org/content-series/airpower-after-ukraine/commercial-satellites-are-on-the-front-lines-of-war-today-heres-what-this-means-for-the-future-of-warfare/>> accessed 20 August 2023: “[w]hile the first Gulf War is often characterized as the first space war, the ongoing war in Ukraine may be remembered as “the first

However, this reliance on Space militarisation to carry out armed conflicts serves as an objective to work towards Space weaponisation. Lambakis highlights that one of the consequences of this reliance on Outer Space-based technology to carry out military activities is that “a future ASAT-wielding adversary of the United States might be capable of leveraging a victory out of otherwise hopeless military circumstances.”<sup>117</sup> Furthermore, the situation that arose in the Persian Gulf War is highly unlikely to arise again, as the advantages that Outer Space can add to military activities are within the knowledge of future enemies and the number of States with these Outer Space capacities is constantly increasing. For example, India is a State that has worked significantly on its Outer Space military capabilities, with Indian defence experts emphasizing “the vital contributions of spacecraft to intelligence acquisition, battle management, and weapon precision, and they understand such technologies to be a sine qua non for all nations seeking power status.”<sup>118</sup> The ultimate effect of Desert Storm was to reduce the gap between militarisation and weaponisation in Outer Space, and not just for the original ‘Space Powers’ of the US and Russia, as China’s 2007 ASAT test demonstrated. Desert Storm also indicated a significant change in the way armed conflicts would be conducted. The coalition’s use of satellite information to instruct their tactics would be the first time a party to an armed conflict would utilise Outer Space to their advantage and conflicts have seen such use of Outer Space ever since. This was a significant step in militarising Outer Space as it was the start of the inclusion of Outer Space into Earth-based conflicts and thus, while Outer Space was not occurring in Outer Space, the environment itself became a central consideration in military tactics and operations. The acceptance of the role of Outer Space into armed conflicts by States and the advantages it offered was widespread. This could

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commercial imagery conflict.” Commercial space companies are delivering critical capabilities to Ukrainian soldiers and civilians alike, demonstrating that commercial and dual-use satellites can help bolster a country’s national security.”

<sup>117</sup> Steven Lambakis, ‘Space control in Desert Storm and beyond’ (1995) 39(3) ORBIS 417, 425.

<sup>118</sup> *ibid* 427.

encourage looking to Outer Space as a domain of weapons use, which poses significant risk to humankind as a whole, not just the parties to the on-Earth armed conflict or relevant civilian populations. This risk is increased by the gap that this research identifies in the ISL and IHL frameworks, which means that such weapons use is largely unregulated. Considerations on the impact on humankind, especially with regards to unnecessary suffering that could be caused, as outlined in the principle of humanity, is important as Outer Space was incorporated into armed conflicts since Operations Desert Storm. This increase in militarisation was demonstrated by China's ASAT weapons test, which is discussed in the following sub-section.

#### **6.5.5 2007 – China's First Successful ASAT Missile Test**

Prior to 2007, ASAT missiles had only been tested by the US and Russia. However, in January 2007, "China performed a successful anti-satellite (ASAT) missile test using a kinetic kill vehicle launched from the Xichang Satellite Launch Center (XSLC), a facility in Sichuan Province".<sup>119</sup> While China's Space-faring activities were known to be close behind those of the US and Russia, this was the first time China's Space weapons capacities were demonstrated to the world.

What Mineiro describes as a "kinetic kill vehicle",<sup>120</sup> the ASAT missile targeted and successfully "destroyed an aging, but functioning, Chinese weather satellite, the Feng Yun 1C (FY-1C)".<sup>121</sup> This event marked the first destruction of a satellite since the ASAT tests carried out by the US and the USSR during the Cold War. This act by China increased the momentum of the militarisation of Outer Space. For example, the US announced in February 2008 that it was going to use a kinetic ASAT missile to destroy

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<sup>119</sup> 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(2) *Journal of Space Law* 321.

<sup>120</sup> *Ibid.*

<sup>121</sup> *Ibid.*

the USA-193 satellite which was deemed a necessity, because as Johnson, who had been involved in the effort, noted in 2021 “[t]he United States had marshalled world-wide criticism of China for its ASAT test, not only for the enormous amount and long-lived nature of the orbital debris created, but also for escalating tensions and risking an arms race in space...[t]he test of an ASAT system by the United States would have freed [China] from future constraints”.<sup>122</sup> However, the momentum that ASAT missiles and weaponisation of Outer Space gained from China’s 2007 test was followed by what could be described as a contrasting reaction from China just a year later.

China’s demonstration of their ASAT weapons capabilities was significant as it signalled a new powerful State actor in Outer Space had joined the Cold War Space Powers of the United States and Russia. This added more tension and more competition for the United States and Russia to maintain a position of power in the “high ground”<sup>123</sup> of the Outer Space domain. It also constituted activity in Outer Space that was not previously present, adding to the crowding of the Outer Space environment. Overall, it was a display of weapons capabilities by a possible powerful adversary in the Outer Space environment and showed that the militarisation of Outer Space was still occurring. The gap in the legal framework that applies to weapons use in Outer Space identified in this research did not prohibit China’s ASAT weapons test.

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<sup>122</sup> Nicholas L. Johnson, ‘Operation Burnt Frost: A View from Inside’ (2021) 56 (101411) *Space Policy* 1, 5.

<sup>123</sup> Michael N Schmitt, ‘International Law and Military Operations in Space’ in A von Bogdandy and R Wolfrum (eds) *Max Planck Yearbook of United Nations Law* (Vol 10 Brill 2006) 94.

### **6.5.6 2008 – Draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects (PPWT) by Russia and China<sup>124</sup>**

The 2008 Committee on Disarmament saw a collaboration between what Su describes as “the two countries believed to have the capacity to weaponize outer space following the U.S.”<sup>125</sup> – Russia and China, in which they presented a 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. This was a contrasting position taken by China in light of its ASAT missile test just a year earlier. Nevertheless, the two Space-faring States, whose latest version of the Draft Treaty was issued in June 2014,<sup>126</sup> encouraged the prevention of an arms race breaking out in Outer Space. However, this proposal, discussed in Chapter 5, has remained a draft treaty and the move towards weaponisation and a possible arms race in Outer Space has continued, led by an undeterred US, which claimed that the 2008 proposal by China and Russia was merely a collaboration of convenience in an attempt to gain military advantage. For example, during the Trump Administration, the United States “identified the PPWT and PAROS and the space weapon front in general as a tool of lawfare directed at the U.S. and its allies to erode space control as opposed to legitimate measures to address outer space security.”<sup>127</sup>

The stagnation of progress with regards to the draft PPWT is illustrative of the difficulty in gaining consensus on and dealing with the gap in the legal regime for the regulation of the use of weapons in Outer Space. The evident divergence of State opinions with regards

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<sup>124</sup> 2008 Draft PPWT.

<sup>125</sup> Jinyuan Su, ‘Use of Outer Space for Peaceful Purposes: Non-Militarization, Non-Aggression and Prevention of Weaponization’ (2010) 36(1) *Journal of Space Law* 253, 267.

<sup>126</sup> 2014 Draft PPWT. See also Brian G Chow, ‘Space Arms Control: A Hybrid Approach’ (2018) 12(2) *Strategic Studies Quarterly* 107, 111.

<sup>127</sup> Michael Listner, ‘Space Weapons: A Briefing with Recommendations for the Biden Administration’ (Centre for Security Policy, May 2021) < [https://centerforsecuritypolicy.org/wp-content/uploads/2021/05/Listner\\_Space\\_Weapons\\_PDF\\_Optimize-1.pdf](https://centerforsecuritypolicy.org/wp-content/uploads/2021/05/Listner_Space_Weapons_PDF_Optimize-1.pdf)> accessed 13 September 2023, 5.

to Russia, China and the United States is, as mentioned, influenced by relations between those States, as opposed to being based purely on considerations of the dangers posed to Outer Space, Earth and humankind. The PPWT is an example of an attempt to address weapons use in Outer Space that did not garner enough support to enter into force. It provides useful understanding for this research regarding previous attempts at weapons regulation instruments that were not successful. This information and the analysis of weapons regulation instruments in the IHL framework that are explored in Chapter 4 inform the approach that this research recommends to addressing the gap in the legal regimes that regulates weapons use in Outer Space.

#### **6.5.7 2019 – NATO ‘Operational Domain’ Announcement**

As discussed in Section 6.1, the most recent actions of NATO have consolidated the categorization of Outer Space as a ‘theatre of warfare’. As the militarisation of Outer Space continued to increase, many domestic military manuals, especially those of States with Space-faring and significant military capacities, refer to Outer Space because “[m]ilitary policies and doctrines for warfighting in space are being developed and propagated.”<sup>128</sup>

This trend was reflected in the decision of NATO in 2019 to issue an “open declaration of space as a ‘operational domain’”.<sup>129</sup> Sweijts and Osinga note that “those who manage to harness and exploit new technologies, combine them with novel operational and organisational concepts and evolve a new way of war stand to gain significantly”,<sup>130</sup> and

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<sup>128</sup> Ram S Jakhu, Kuan-Wei Chen and Bayar Goswami, ‘Threats to Peaceful Purposes of Outer Space: Politics and Law’ (2020) 18(1) *Astropolitics* 22, 30.

<sup>129</sup> *Ibid.*

<sup>130</sup> Tim Sweijts and Frans Osinga, ‘VIII. Maintaining NATO’s Technological Edge’ (2019) 95(1) *Whitehall Papers* 104, 111.

as discussed above, in order to “keep pace with rapid technological advances”,<sup>131</sup> NATO must constantly update and alter its capacities. Thus, in order to have the same military advantages as modern military States, NATO recognised the militarisation of Outer Space and prepared itself for the potential weaponisation and warfare that could occur in that domain.

Nevertheless, while NATO’s recognition of Outer Space as an operational domain was a significant moment in the timeline of the militarisation of Outer Space, it is notable that NATO, in their 2022 Strategic Concept, re-iterated their recognition of “the applicability of international law and will promote responsible behaviour in cyberspace and space.”<sup>132</sup> Thus, NATO’s addition of a new operational domain may not have been intended to escalate the solidification of the ‘theatre of warfare’ as Outer Space’s status. However, as Section 6.2 considers, NATO’s recognition of Outer Space as an ‘operational domain’ did serve to highlight the militarised nature of Outer Space. This interpretation of Outer Space as a ‘theatre of warfare’ was bolstered by the introduction of the military branch of the Space Force by the United States in the same year, as is discussed in the following sub-section. NATO’s recognition of Outer Space as a ‘operational domain’ suggests that it is recognised as an environment in which weapons use and armed conflict could occur and recognised as such by an international military alliance. This serves to solidify the recognition of the militarised nature of Outer Space and even legitimise the possibility of weapons use therein. As this research highlights, such weapons use could occur without specific regulation at present and thus, the need for regulation to address this gap is further highlighted by NATO’s recognition of Outer Space as an operational domain.

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<sup>131</sup> Ibid.

<sup>132</sup> NATO, ‘NATO 2022 Strategic Concept’ (29 June 2022) <[https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept.pdf)> accessed 28 September 2023, para 25.

### **6.5.8 2019 – United States’ ‘Space Force’ Announcement**

2019 witnessed not only the recognition of Outer Space as an operational domain by NATO, this year also saw announcement by the United States that a ‘Space Force’ branch would be introduced into their armed forces.<sup>133</sup> While, as Chapter 5 notes when discussing NASA’s role, the military aspects of Outer Space activities were always to be under the auspices of the Department of Defence of the US Government, the ‘Space Force’ was now putting manpower behind US Outer Space military operations with a specialised group of the US Air Force. When the announcement was made by President Trump, he described Outer Space as “the world’s newest war-fighting domain”,<sup>134</sup> illustrating the United States’ recognition of the ‘theatre of warfare’ status of Outer Space and creation of a ‘Space Force’ in response to the increase in the militarised nature of the domain, while also spurring on further militarisation by taking this step.

The militarisation of Outer Space began alongside humankind’s first interactions with Outer Space with the launch of Sputnik I, as even the smallest and simplest satellite had the potential to be used to gain military advantage. Thereafter, the militarisation of Outer Space has steadily increased, with weapons testing giving Space-faring States a glimpse into what weaponisation of Outer Space could constitute. This brief timeline of the historical development of Outer Space as a ‘theatre of warfare’ is illustrative of humankind’s movement away from the Space Security discussed in Section 6.3. It is thus important for this research as it is illustrative of the heightened need for weapons regulation as this move away from Space Security appears to be a move towards weaponisation, the prospect of which appeals to States wishing to gain military power

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<sup>133</sup> BBC News, ‘Space Force: Trump officially launches new US military service’ (21 December 2019) <<https://www.bbc.com/news/world-us-canada-50876429>> accessed 20 August 2023.

<sup>134</sup> Ibid.

over Outer Space. This escalation from militarisation to weaponisation has already begun as the testing by States of ASAT weapons from Earth-to-Space has already been witnessed and the technological capabilities for orbiting ASAT weapons also exists. Furthermore, as Chapter 1 mentions, many weapons that can also be used in Outer Space are conventional in nature and likely already exist in States' military arsenals. The trend towards militarisation that this section's timeline illustrates is one of an increasing likelihood of use of weapons in Space, which as this research establishes, will be unregulated by both ISL and IHL. The next section outlines the weapons that are of concern with respect to the increasing prospect of this weapons use and outlines the 'Space weapons' of which there is present awareness.

## **6.6 What is a 'Space Weapon?'**

As was noted in a 2020 CSIS Report, “[l]ittle consensus exists in the international community on what constitutes a space weapon”.<sup>135</sup> While this may pose difficulties, Grego notes that “it is useful to understand that space technologies are not so different as to be undefinable.”<sup>136</sup> Further, with Art IV of the 1967 Outer Space Treaty<sup>137</sup> only expressly prohibiting nuclear weapons and weapons of mass destruction, the weapons which are permissible to be placed in Outer Space are conventional weapons, such as those regulated in the 1980 CCW.<sup>138</sup> Conventional weapons are defined as those which are “generally employed in armed conflict”.<sup>139</sup> While conventional weapons possible for

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<sup>135</sup> Todd Harrison, 'International Perspectives on Space Weapons: A Report of the CSIS Aerospace Security Project' (Centre for Strategic & International Studies, May 2020) < [https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/200527\\_Harrison\\_IntlPerspectivesSpaceWeapons\\_WEB%20FINAL.pdf](https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/200527_Harrison_IntlPerspectivesSpaceWeapons_WEB%20FINAL.pdf) > accessed 18 May 2022, IV.

<sup>136</sup> Laura Grego, 'The Case for Space Arms Control' in Melissa de Zwart ad Stacey Henderson (eds) *Commercial and Military Uses of Outer Space* (Springer 2021) 88.

<sup>137</sup> 1967 Outer Space Treaty, art IV.

<sup>138</sup> 1980 Convention on Certain Conventional Weapons.

<sup>139</sup> ICRC, 'Conventional Weapons' <<https://casebook.icrc.org/glossary/conventional-weapons> > accessed 19 May 2022.

use in Outer Space would require more technological advancement than those that are purely Earth-based, they remain inherently conventional in nature. This is why the general approach taken to defining what a 'space weapon' constitutes is rather broad, as evidenced in the approach taken by Mutschler that "a space weapon is any device, whether land -, sea -, air -, or space-based, purposely designed to damage or destroy an object in orbit, or any space-based device designed to attack targets on earth."<sup>140</sup>

An important characteristic of a 'space weapon' has been established as being that it actually be 'placed' in Space. This means that weapons, even weapons of mass destruction that are prohibited in Art IV of the 1967 Outer Space Treaty,<sup>141</sup> that are considered to be just travelling or transiting through Outer Space will not be considered as legitimate space weapons. It is emphasised that "the mere transit of weapons of mass destruction through outer space, for example by means of intercontinental ballistic missiles (ICBMs), does not fall under the prohibition of this Article. ICBMs are in outer space only for a limited time and cannot be considered as being 'placed' in space."<sup>142</sup> An additional concern with respect to transiting weapons not being considered as 'placed' in Outer Space and thus, not being subject to prohibition is the fact that, as Tronchetti highlights, "as far as Article IV (1) is concerned outer space may be employed as a transit area for weapons aimed at and used on earth."<sup>143</sup>

As established, the placement of conventional weapons in Outer Space is permitted. However, there are different conventional weapons for the Outer Space environment that

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<sup>140</sup> Max M Mutschler, *Arms Control in Space* (Palgrave MacMillan 2013) 109.

<sup>141</sup> 1967 Outer Space Treaty, art IV.

<sup>142</sup> Fabio Tronchetti, 'Legal Aspects of the Military Uses of Outer Space' in Frans von der Dunk and Fabio Tronchetti (eds), *Handbook of Space Law* (Edward Elgar Publishing 2015) 337. See also Christopher M. Petras, 'The Debate over the Weaponization of Space: A Military-Legal Conspectus' (2003) 28 *Annals Air & Space Law* 171, 184-185: "the provision was deliberately worded to permit the terrestrial use of intercontinental ballistic missiles (ICBMs), which incidentally pass through space, due to the fact that the national defense systems of the two major space powers at the time were both based upon ICBMs."

<sup>143</sup> *Ibid.*

must be distinguished from each other. This research, and the recommendations for regulation that it forms, focus primarily on kinetic weapons, but mention will also be made to the non-kinetic weapons, as well as the other tactics that can be weaponised and implemented in military operations in Outer Space (such as jamming or cyber warfare tactics). Within these categories, there are a variety of space weapons currently within States' military arsenals which could be deployed in the 'theatre of warfare' of Outer Space, some of which are discussed below.

### **6.6.1 Kinetic Space Weapons**

Blake describes that "crude, purely kinetic weapons can be effective in space".<sup>144</sup> Kinetic space weapons as described as those which "attempt to strike directly or detonate a warhead near a satellite or ground station".<sup>145</sup> Thus, the harnessing of kinetic energy to cause destruction, while slightly more complex to orchestrate to or in Outer Space than on-Earth (although the CSIS 2023 Space Threat Assessment does recognise the attacking of Space stations on-the-ground as a kinetic attack<sup>146</sup> is an advancement in weapons technology that many States have achieved, as has been demonstrated through anti-satellite weapons tests.

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<sup>144</sup> Duncan Blake, 'Military Strategic Use of Outer Space' in Hitoshi Nasu and Robert McLaughlin (eds) *New Technologies and the Law of Armed Conflict* (Asser Press 2014) 108.

<sup>145</sup> Centre for Strategic and International Studies, 'Space Threat Assessment 2023' (April 2023) <[https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414\\_Bingen\\_Space\\_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ](https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414_Bingen_Space_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ)> accessed 13 September 2023, 4.

<sup>146</sup> *Ibid.*

### 6.6.1.1 Anti-Satellite Weapons

At present, four States have demonstrated to have anti-satellite weapons within their military arsenals – the United States, Russia, China and India.<sup>147</sup> Thus, these States have weapons in their military-arsenals that have been seen to cause “damage or destruction of an object, a satellite, for example, ...from the high-speed collision with another object”<sup>148</sup> in the shooting down of their own aging satellites. Koplow outlines that ASAT weapons appeal to States because “the more that countries invest in satellites, the more they become dependent on them, and the greater the payoff for a hostile force that can disrupt their functions”,<sup>149</sup> by use of an ASAT weapon.

Steer and Stephens outline that the capacities that these States have displayed is with regards to kinetic ASAT weapons which are “primarily surface-to-space and air-to-space missiles”.<sup>150</sup> The capabilities currently demonstrated by the four States have been mainly those of direct-ascent ASAT weapons, though it is suspected that some of these States have co-orbital satellite capabilities also.

#### 6.6.1.1.1 Direct-Ascent Anti-Satellite Weapons

Direct ascent ASAT Weapons are those that are launched from Earth to Space with the intent of destroying the space object towards which they are targeted – a satellite. While they may destroy satellites using merely kinetic energy, these conventional weapons are technologically advanced in the sense that their ability to harness the kinetic energy in

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<sup>147</sup> Jinyuan Su, ‘The Legal Challenge of Arms Control in Space’ in Cassandra Steer and Matthew Hersch (eds), *War and Peace in Outer Space: Law, Policy, and Ethics* (Oxford University Press 2021) 181: “[t]he pursuit of ASATs, by both the United States and the former Soviet Union, can be traced back to the Cold War...In the last two decades, China and India have joined in the elite club of States with this capability.”

<sup>148</sup> Max M Mutschler, *Arms Control in Space* (Palgrave MacMillan 2013) 110.

<sup>149</sup> David A Koplow, ‘Asat-atisfaction: Customary International Law and the Regulation of Anti-Satellite Weapons’ (2009) 30(4) *Michigan Journal of International Law* 1187, 1200.

<sup>150</sup> Cassandra Steer and Dale Stephens, ‘International Humanitarian Law and Its Application in Outer Space’ in Cassandra Steer and Matthew Hersch (eds) *War and Peace in Outer Space: Law, Policy, and Ethics* (Oxford University Press 2021) 26.

order to destroy their targets has become possible due to technological advancements since the Cold War period. Blake notes that “guidance systems on interceptor missiles have improved and direct-ascent anti-satellite weapons developed more recently are designed to actually hit their targets or explode very close to them.”<sup>151</sup>

#### **6.6.1.1.2 Co-Orbital Anti-Satellite Weapons**

In the category of anti-satellite weapons, there are also co-orbital ASATs, which “are rocket-launched objects that achieve a similar orbital plane as the intended target. Once within orbit, an ASAT can be steered until it is in close proximity of the target – close enough to physically collide with it.”<sup>152</sup> Co-orbital anti-satellites weapons would be considered as a space to space weapon,<sup>153</sup> while the previously-discussed direct-ascent anti-satellite weapons would fit the category of Earth-to-space weapons.<sup>154</sup>

China possess the capabilities that could be adopted to co-orbital ASAT weapons as they have conducted “[c]o-orbital technology demonstrations [which] prove China’s ability to rendezvous with other satellites in GEO.”<sup>155</sup> Similarly, Russia’s co-orbital ASAT weapons potential is deduced from the manoeuvring of space objects such as satellites, with “Luch, Russia’s well-known GEO inspector satellite, maneuvered several times in

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<sup>151</sup> Duncan Blake, ‘Military Strategic Use of Outer Space’ in Hitoshi Nasu and Robert McLaughlin (eds.) *New Technologies and the Law of Armed Conflict* (Asser Press 2014) 110.

<sup>152</sup> Cassandra Steer and Dale Stephens, ‘International Humanitarian Law and Its Application in Outer Space’ in Cassandra Steer and Matthew Hersch (eds) *War and Peace in Outer Space: Law, Policy, and Ethics* (Oxford University Press 2021) 28.

<sup>153</sup> Duncan Blake, ‘Military Strategic Use of Outer Space’ in Hitoshi Nasu and Robert McLaughlin (eds.) *New Technologies and the Law of Armed Conflict* (Asser Press 2014) 108.

<sup>154</sup> *Ibid* 109.

<sup>155</sup> Centre for Strategic and International Studies, ‘Space Threat Assessment 2023’ (April 2023) <[https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414\\_Bingen\\_Space\\_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ](https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414_Bingen_Space_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ)> accessed 13 September 2023, 11: “[w]hile these are not counterspace weapons tests, they demonstrate capability that is necessary for a co-orbital counterspace attack.”

2022 to closely approach and loiter near three different Intelsat communications satellites.”<sup>156</sup>

Koplow draws attention to the fact that the prohibition in Article IV of the 1967 Outer Space Treaty<sup>157</sup> “does not impede the stationing of non-nuclear weapons (including conventional ASAT weapons) in space”.<sup>158</sup> The only additional limitation placed on weapons that are not nuclear weapons or weapons of mass destruction, is that the testing of weapons may not occur on celestial bodies, such as the Moon.<sup>159</sup> This means that the placement, testing and use of the co-orbital ASAT weapons discussed are not prohibited – nor are they addressed in the current ISL framework. Co-orbital ASAT weapons, unlike the direct-ascent ASAT weapons tests that have been witnessed to-date, would render Outer Space ‘weaponised’ as there would be weapons placed in orbit as opposed to weapons operating from Earth-to-Space. The lack of regulation of the use of both direct-ascent and co-orbital ASAT weapons is illustrative of the gap in the ISL and IHL frameworks that this research seeks to address. At present, ASAT weapons are the primary kinetic ‘Space weapon’ technologies known to be in States’ military arsenals and as will be discussed in the following sub-section, they have the potential to cause unnecessary suffering and superfluous injury in Outer Space and to humankind on Earth; particularly without any specific limitations on their use in the ISL or IHL frameworks.

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<sup>156</sup> Ibid 14.

<sup>157</sup> 1967 Outer Space Treaty, art IV.

<sup>158</sup> David A Koplow, ‘Asat-isation: Customary International Law and the Regulation of Anti-Satellite Weapons’ (2009) 30(4) Michigan Journal of International Law 1187, 1198. See also Duncan Blake, ‘The Law Applicable to Military Strategic Use of Outer Space’ in Hitoshi Nasu & Robert McLaughlin (eds), *New Technologies and the Law of Armed Conflict* (Asser Press 2014) 119: “it appears that conventional weapons are permissible in space”.

<sup>159</sup> 1967 Outer Space Treaty, art IV: “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.”

#### **6.6.1.1.3 Risk of Unnecessary Suffering and Superfluous Injury from use of ASAT Weapons**

The CSIS have highlighted that “[t]hese types of attacks are one of the only counterspace actions that carry the potential for the direct loss of human life if targeted at crewed ground stations or at satellites in orbits where humans are present, such as the International Space Station (ISS) in low Earth orbit (LEO).”<sup>160</sup> It is for this reason that this research focuses predominantly on forming recommendation for the regulation of kinetic space weapons as their use is that which can result directly in unnecessary suffering and superfluous suffering for humans and humankind. Thus, while these conventional weapons that use kinetic energy may be basic in the nature in which they seek to attack and destroy targets, they do pose a serious risk, although as the next section discusses, have had many States agree to ban their tests. Nevertheless, as noted with respect to direct-ascent ASAT weapons, improvements in their technology came after the Cold War and thus, there is the possibility that the foundation laid by the exist ASAT weapons technology could be expanded upon to form new kinetic weapons technologies that will require regulation also.

#### **6.6.1.1.4 ASAT-Testing Ban**

In April 2022, United States Vice-President Kamala Harris announced that a ban on anti-satellite tests was being enacted in the United States,<sup>161</sup> with considerations of creation of space debris from such weapons tests and the overall sustainability of the Outer Space

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<sup>160</sup> Centre for Strategic and International Studies, ‘Space Threat Assessment 2023’ (April 2023) <[https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414\\_Bingen\\_Space\\_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ](https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414_Bingen_Space_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ)> accessed 13 September 2023, 4.

<sup>161</sup> Shiona McCallum, ‘US bans anti-satellite missile tests’ (*BBC News*, 19 April 2022) <<https://www.bbc.com/news/technology-61151141>> accessed 8<sup>th</sup> May 2022.

environment cited as the rationale for this ban for the US.<sup>162</sup> Following on from this, May 2022 saw the first meeting of the UN Open Ended Working Group on Reducing Space Threats, where support for the ASAT testing ban was expressed by France, Ireland, the UK, Germany and South Korea, and the ban was formally joined by Canada.<sup>163</sup> Thus, the threat of an escalation of ASAT capabilities among States may be quelled by this testing ban. However, interestingly, while this ban has been welcomed by many States and is illustrative of a step towards supporting the maintenance of the use of Outer Space for peaceful purposes, it was noted by General Chilton that the US ASAT ban should not “constrain the development and fielding of U.S. offensive space capabilities.”<sup>164</sup> This interpretation of how to best implement the ban while also allowing the US to maintain a strong military position with respect to Outer Space is similar to the compliance of the US with the 1963 Limited Test Ban Treaty<sup>165</sup> when they still maintaining their nuclear weapons supplies to deter other potential aggressor States. Thus, while this ban on ASAT testing is a welcome step in the escalating environment of Outer Space, it should not be interpreted as an indication of the US removing ASATs from their military arsenal.

## **6.6.2 Non-Kinetic Weapons**

### **6.6.2.1 Electromagnetic Pulse Weapons**

Whether the use of electromagnetic pulse (EMP) weapons would be prohibited in Outer Space is uncertain as an EMP itself is formed when “a high-altitude nuclear explosion in

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<sup>162</sup> The White House, ‘Fact Sheet: Vice President Harris Advances National Security Norms in Space’ (18 April 2022) < <https://www.whitehouse.gov/briefing-room/statements-releases/2022/04/18/fact-sheet-vice-president-harris-advances-national-security-norms-in-space/>> accessed 19 May 2022.

<sup>163</sup> Jeff Foust, ‘Canada Joins U.S. in ASAT Testing Ban’ (Space News, 9 May 2022) < <https://spacenews.com/canada-joins-u-s-in-asat-testing-ban/>> accessed 10 May 2022.

<sup>164</sup> General Kevin Chilton, ‘The anti-satellite test ban must not undermine deterrence’ (Defence News, 29<sup>th</sup> April 2022) < <https://www.defensenews.com/opinion/commentary/2022/04/29/the-anti-satellite-test-ban-must-not-undermine-deterrence/>> accessed 10 May 2022.

<sup>165</sup> 1963 Limited Test Ban Treaty.

space sends a cascade of gamma rays to collide with the upper atmosphere of Earth”,<sup>166</sup> sending a destructive electrical current out which could affect satellites or any technology within a certain radius. However, while the EMP itself that is emitted is caused by a nuclear explosion, it is the pulse that is the weaponised element, not the nuclear explosion. Tronchetti notes that “not all forms of nuclear *reactions* in space are prohibited. For example, recourse to small atomic bombs for propulsion of a spacecraft is allowed, as such a spacecraft does not qualify as a nuclear weapon and its main goal is to carry passengers and materials in space.”<sup>167</sup> This same mentality could be applied, as it is the pulse caused by the nuclear explosion that is the element that is causing damage, not the nuclear explosion itself. In addition, when discussing numerous space weapons, including EMPs Steer and Stephens note that “[a]ll the weapons systems discussed here are not prohibited by the Outer Space Treaty and do not fall foul of any other specific weapons-based treaty or IHL treaty of general application,”<sup>168</sup> which establishes the permissibility of the use of EMPs at this time in Outer Space.

The damage that an EMP can cause is described by Kuplic as a “type of explosion [which] could be used in outer space to cause blackouts across a range of land on Earth, a significant advantage during wartime.”<sup>169</sup> The presence of EMPs in the US military arsenal, with regards to Earth-based conflict, was reported with respect to the conflict in the former-Yugoslavia. Ghosh outlines that, while the Pentagon denied the use or intention of use of the weapon that the US were reportedly testing at the time in the

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<sup>166</sup> Cassandra Steer and Dale Stephens, ‘International Humanitarian Law and Its Application in Outer Space’ in Cassandra Steer and Matthew Hersch (eds) *War and Peace in Outer Space: Law, Policy, and Ethics* (Oxford University Press 2021) 28.

<sup>167</sup> Fabio Tronchetti, ‘Legal Aspects of the Military Uses of Outer Space’ in Frans von der Dunk and Fabio Tronchetti (eds), *Handbook of Space Law* (Edward Elgar Publishing 2015) 336.

<sup>168</sup> Cassandra Steer and Dale Stephens, ‘International Humanitarian Law and Its Application in Outer Space’ in Cassandra Steer and Matthew Hersch (eds) *War and Peace in Outer Space: Law, Policy, and Ethics* (Oxford University Press 2021) 29-30.

<sup>169</sup> Blair Stephenson Kuplic, ‘The Weaponization of Outer Space: Preventing an Extraterrestrial Arms Race’ (2014) 39(4) *North Carolina Journal of International Law and Commercial Regulation* 1123, 1140.

Yugoslav armed conflict, there was no rejection of the existence of a weapon which, when exploded, “would be followed by generation of high power microwaves that can disable electronic circuitry in computers and communication equipment”<sup>170</sup> – an EMP weapon. As noted, EMP as a destructive characteristic that could potentially be weaponised was “first observed during the early testing of high altitude airburst nuclear weapons”;<sup>171</sup> weapons tests which were prohibited by instruments that are discussed in Chapter 5.

EMP weapons are a type of directed-energy weapon, which are described by the UN Institute for Disarmament Research (UNIDIR) as “a type of electromagnetic or particle technology which use energy, as opposed to a physical projectile, to strike a target.”<sup>172</sup> Blake discusses how the use of Earth-based weapons systems to attack targets in Outer Space is inclusive of instances where “[t]he space segment can be attacked with terrestrially-based directed energy weapons.”<sup>173</sup> These weapons involve the harnessing of energy and directing it, as the name suggests. An example would be laser weapons. While the Protocol IV of the 1980 CCW<sup>174</sup> prohibits weapons that use lasers “specifically designed, as their sole combat function or as one of their combat functions, to cause permanent blindness to unenhanced vision, that is to the naked eye or to the eye without corrective eyesight devices.”<sup>175</sup> However, this does not extend to prohibiting all laser weapons as it is the specific aim to cause blindness that is prohibited, with Article 3 of the Protocol noting that an accidental or unintended result of blindness cause by general laser weapons use is not included in the prohibition.<sup>176</sup> Thus, the use of laser weapons as

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<sup>170</sup> C.N. Ghosh, ‘EMP weapons’ (2000) 24(7) *Strategic Analysis* 1333.

<sup>171</sup> *Ibid* 1334.

<sup>172</sup> Sarah Grand-Clément, ‘Directed Energy Weapons: A New Look at an ‘Old’ Technology’ (UNIDIR) <<https://unidir.org/commentary/directed-energy-weapons-new-look-old-technology>> accessed 20 August 2021.

<sup>173</sup> Duncan Blake, ‘Military Strategic Use of Outer Space’ in Hitoshi Nasu and Robert McLaughlin (eds) *New Technologies and the Law of Armed Conflict* (Asser Press 2014) 109.

<sup>174</sup> 1995 Protocol IV to the 1980 Convention on Certain Conventional Weapons.

<sup>175</sup> *Ibid* art 1.

<sup>176</sup> *Ibid* art 3.

directed-energy weapons in Outer Space is not prohibited by the general IHL instruments that apply to Outer Space as per Article III of the 1967 Outer Space Treaty.<sup>177</sup> EMPs and directed energy weapons are another weapons technology envisaged for use in Outer Space that have been developed and thus, serve to illustrate the militarised, and almost weaponised nature of Outer Space.

#### **6.6.2.2 Weaponisation of ‘Soft Kill’ Armed Conflict Techniques**

‘Soft Kill’ techniques, rather than constituting physical weapons themselves, are defined by Steer and Stephens as a “category of weapons [which] includes those designed to disable the functionality of a satellite rather than destroy it.”<sup>178</sup> Examples include the use of cyberattacks on enemy satellite systems or jamming of a variety of systems, with Boothby listing the examples of the jamming of “targeting or tracking capabilities of missile defense systems”,<sup>179</sup> of “positioning, navigation and timing systems and of satellite communications”<sup>180</sup> and of “communications systems”.<sup>181</sup> These techniques are not yet subject to express prohibition. Thus, they could be implemented to interrupt the functioning of satellites.

These weapons that this section outlines currently present risks as their use in Outer Space is not expressly prohibited in the IHL or ISL legal frameworks and this risk emphasises the relevance of this research in forming recommendations for the regulation of weapons use in Outer Space. This research chooses to focus on the regulation of kinetic weapons, such as ASAT weapons and the conventional weapons that can function in Outer Space.

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<sup>177</sup> 1967 Outer Space Treaty, art III.

<sup>178</sup> Cassandra Steer and Dale Stephens, ‘International Humanitarian Law and Its Application in Outer Space’ in Cassandra Steer and Matthew Hersch (eds) *War and Peace in Outer Space: Law, Policy, and Ethics* (Oxford University Press 2021) 29.

<sup>179</sup> William Boothby, ‘Space Weapons and the Law’ (2017) 93 *International Law Studies* 179, 210.

<sup>180</sup> *Ibid.*

<sup>181</sup> *Ibid.*

From the perspective of the principle of humanity in IHL, these weapons pose the immediate threat with regards to unnecessary suffering and superfluous injury in Outer Space and to humankind as a whole. Kinetic weapons utilise force or kinetic energy to strike a target and cause damage and destruction that can result in unnecessary suffering. Jamming, cyber warfare techniques and directed-energy weapons do not pose the same risk of destruction, suffering or injury to humans or humankind. It is for this reason that these weapons and warfare techniques are not the focus of this research's recommendations for regulation. As the kinetic weapons that can be used in Outer Space could vary in nature within the realm of conventional weapons, this research argues that regulation should not focus on a characteristic of the weapons, as is a common weapons regulation approach discussed in Chapter 4. Rather the focus for regulation should be on the domain of the weapons use – that of Outer Space. As is noted earlier in this chapter, the domain of Outer Space as a 'theatre of warfare' where hostilities could be conducted is unique in nature. Thus, the recommendations that this research forms for the regulation of kinetic weapons highlights the use of such weapons, which this section discusses, in the domain of Outer Space.

### **6.7 Significance of Gaining Military Power over Outer Space**

A significant driving force behind the militarisation of Outer Space has been the military advantage that it grants to States, be it through the jamming of an adversary's satellites or using military satellites to gather information vital to targeting operations, etc. during an armed conflict. Schmitt highlights that "Space offers unique advantages to the war fighter. Among them, global access is preeminent. Because space is borderless, there are no normative barriers impeding access to any point within space. Thus, space represents

the apogee of what combat commanders have sought for centuries, “the high ground.”<sup>182</sup> However, the greater number of States that acquire the advantages offered by the militarisation of Outer Space, the less of an advantage it becomes. The arrival at this reality has introduced a discourse in favour of weaponisation of Outer Space as a military advantage.

Dolman highlights that the objective of military force is not to create and win wars. Rather, wars, or the threat thereof, are one of the “policy instruments that the political authority needs readily available to conduct the affairs of state”.<sup>183</sup> This means that military force, as efficient and advantageous as possible, must be at hand should the political powers of a State choose to utilise them for the State’s best interests. The argument put forward by Dolman is that the inclusion of weapons which can operate in Outer Space into a State’s military arsenal is not synonymous with an aim of starting a war in Outer Space. Rather, it gives the State’s military the advantage required to conduct modern warfare efficiently, whenever the political powers decide that this need arises.

Nevertheless, it is also noted that “[t]he purpose of space power...is to command space”.<sup>184</sup> Thus, the capabilities to utilise weapons in Outer Space and the power that this gives a State is recognised by other States as control over Outer Space. However, with the increasing Outer Space and military capacities of numerous States, Dolman’s theory that “the point of domination of space by military means would be to deter other states

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<sup>182</sup> Michael N. Schmitt, ‘International Law and Military Operations in Space’ in A von Bogdandy and R Wolfrum, *Max Planck Yearbook of United Nations Law* (Vol 10, Brill 2006) 94. See also Jinyuan Su, ‘The “peaceful purposes” principle in outer space and the Russia-China PPWT Proposal’ (2010) 26 *Space Policy* 81 wherein it is recognised that “[o]uter space, in parallel with the high seas and Antarctica, is one of the transnational spatial areas which have been stages for interstate political wrestling because of their strategic significance and resource potentiality” and such strategic significance can be aligned with the environment being a military ‘high ground’. See also David E Lupton, *On Space Warfare: A Space Power Doctrine* (Air University Press 1998) 21: “the old military axiom that domination of the high ground ensures domination of the lower lying areas.”

<sup>183</sup> Everett C. Dolman, ‘A Debate About Weapons in Space: For U.S. Military Transformation and Weapons in Space’ (2006) 26(1) *SAIS Review of International Affairs* 163, 166.

<sup>184</sup> *Ibid* 167.

from going there with martial aims”,<sup>185</sup> presupposes that the United States will remain at the forefront of Outer Space technological advancement and also, that other Space faring States will merely cede to United States’ control over Outer Space.

This discourse promoting the weaponisation of Outer Space to grant one State the ultimate military advantage is based on the premise that “the controlling state demonstrates a capacity and a will to use force to defend its position, in effect expending a small amount of violence as needed to prevent a greater conflagration.”<sup>186</sup> Thus, it is presumed that one State will be accepted to rule Outer Space by weaponisation and have a greater military advantage than the rest of Earth and furthermore, that this ruling State will not use their Space-based weapons against other States. However, if this level of international cooperation and acceptance has yet to be achieved on Earth, it is highly unlikely that weaponisation of Outer Space would run as smoothly as this theory suggests. This prospect is rendered even more unlikely by the increased number of States that constitute military actors in Outer Space.

### **6.8 Existing State Military Actors in Outer Space’s ‘Theatre of Warfare’**

Desert Storm illustrated that there is no need for States to have satellites of their own in order to gain an Outer Space-based advantage. Instead, commercial and geographic satellites can be used through collaboration with other States or collaboration with industry and private actors, which, as outlined in Chapter 6, are important actors in Outer Space, usually attributed to previous State investment in the development of these commercial or privately-owned satellites. This prospect has provided an increased number of States with the opportunity to act in the ‘theatre of warfare’ that is Outer Space.

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<sup>185</sup> Ibid.

<sup>186</sup> Ibid 170.

### 6.8.1 United States

The United States arguably remains the central Space-faring State since its success during the Space Race by virtue of the fact that, as Paladini notes, “[n]o country spends, or has ever spent, as much as the USA in the world’s space industry.”<sup>187</sup> While the United States’ budget for space activities has been significantly reduced since the era of the Space Race,<sup>188</sup> it remains the largest budget allocated by any State towards their Outer Space activities. Furthermore, the United States Outer Space effort through NASA has been significantly bolstered in recent times by its collaboration with private actors in the Space industry, such as Elon Musk’s SpaceX, as is discussed further in Section 6.9.

The United States Space effort is divided into NASA’s scientific and exploration space activities and any military activities are dealt with by the Department of Defence and the newly introduced Space Force. This is a distinction that other Space-faring States do not have in their domestic framework and this disparity of approaches to Outer-Space activities tends to cause tension. For example, China is a Space-faring State that “does not have distinctly separate military and civilian space programs”,<sup>189</sup> as is discussed, which is a concern of the United States. Despite this concern over China’s military Outer Space activities, the United States has remained a leader in the militarisation of Outer

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<sup>187</sup> Stefania Paladini, *The New Frontiers of Space: Economic Implications, Security Issues and Evolving Scenarios* (Palgrave Macmillan 2019) 113.

<sup>188</sup> NASA History Division, ‘SP-4012 NASA HISTORICAL DATA BOOK: VOLUME IV NASA RESOURCES 1969-1978’ <[<sup>189</sup> Stefania Paladini, \*The New Frontiers of Space: Economic Implications, Security Issues and Evolving Scenarios\* \(Palgrave Macmillan 2019\) 123.](https://history.nasa.gov/SP-4012/vol4/ch1.htm#:~:text=NASA%27s%20annual%20budget%2C%20which%20had,considerable%20i mpact%20on%20the%20agency.>” accessed 18 August 2023, chpt 1, 3: “NASA’s annual budget, which had reached $5 billion in the mid-1960s and stood at almost $4 billion in 1969, was reduced to $3.7 billion in 1970 and just over $3 billion in 1974. The cuts in the NASA budget had a considerable impact on the agency.”</p></div><div data-bbox=)

Space and the introduction of its Space Force “has raised fears of an arms race in outer space.”<sup>190</sup>

### **6.8.2 Russia**

The second of the ‘Space Powers’ from the Cold War era, it was the satellite launch by Russia that sparked the militarisation of Outer Space and during that period Russia tested both nuclear ABMs and ASAT missiles. Nevertheless, as noted in the historical timeline, Russia collaborated with China in putting forward the Draft Treaty on the Prevention of the Placement of Weapons in Outer Space<sup>191</sup> and has also led an initiative introduced in UN GA Resolution 70/27 “No first placement of weapons in outer space”,<sup>192</sup> which encourages space-faring States to refrain from starting an arms race in Outer Space by not being the first States to place and use weapons in Outer Space. Thus, while Russia’s ability to weaponize Outer Space is well-known, this stance against weaponisation is in stark contrast to the approach of its Cold War adversary.

### **6.8.3 China**

China is also a formidable Space Power State, having “launched its first rocket as early as 1960, and it became the third one [State] to send a man into space”.<sup>193</sup> This State has claim to “the world’s second largest fleet of working spacecraft in orbit and operates several constellations of satellites in the major subsegments – navigation, remote sensing and communication, including military surveillance satellites”.<sup>194</sup> However, China’s

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<sup>190</sup> Ibid 124.

<sup>191</sup> 2008 Draft PPWT.

<sup>192</sup> United Nations General Assembly, ‘No first placement of weapons in Outer Space’ (11 December 2015) UNGA A/RES/70/27.

<sup>193</sup> Stefania Paladini, *The New Frontiers of Space: Economic Implications, Security Issues and Evolving Scenarios* (Palgrave Macmillan 2019) 124.

<sup>194</sup> Ibid 126.

domestic approach towards exploring Outer Space is not detached from its military interests, with the “People’s Liberation Army (PLA) execut[ing] space policy and oversee[ing] the space research, development, and acquisition process. China’s military also exercises control over the majority of China’s space assets and space operations.”<sup>195</sup> It is recognised that “[a]lthough official Chinese statements on space warfare and weapons have remained consistently aligned to the peaceful purposes of outer space, unofficially they have become more nuanced.”<sup>196</sup> China’s stance on the prospective weaponisation of Outer Space is unclear because, as noted in the historical timeline, China followed up its 2007 ASAT missile test with producing a draft treaty on the prevention of placing weapons in Outer Space with Russia.<sup>197</sup>

#### **6.8.4 India**

While media attention on India’s more recent Outer Space activities might give the impression that India is a new Space actor, “[t]he Indian Space Research Organisation (ISRO), was created as long as fifty years ago (1969), carrying out in the 1970s a series of experimentations that led to programmes still in operation today, such as the satellite INSAT and IRS.”<sup>198</sup> India traditionally promoted space technology, “driven by a deep-seated sense of the importance of exploiting space for national development.”<sup>199</sup> This policy also involved opposition of “any indication of militarization of space, including

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<sup>195</sup> Ibid 123.

<sup>196</sup> Dr Brian Weedon and Victoria Samson (eds), ‘Global Counterspace Capabilities: An Open Source Assessment’ (Secure World Foundation April 2023) <[https://swfound.org/media/207567/swf\\_global\\_counterspace\\_capabilities\\_2023\\_v2.pdf](https://swfound.org/media/207567/swf_global_counterspace_capabilities_2023_v2.pdf)> accessed 12 September 2023, xxii.

<sup>197</sup> 2008 Draft PPWT.

<sup>198</sup> Stefania Paladini, *The New Frontiers of Space: Economic Implications, Security Issues and Evolving Scenarios* (Palgrave Macmillan 2019) 132.

<sup>199</sup> Rajeswari Pillai Rajagopalan, ‘India’s Changing Policy on Space Militarization: The Impact of China’s ASAT Test’ (2011) 10(4) *India Review* 354, 356.

criticizing programs such as missile defence and ASAT programs, usually those announced by the US.”<sup>200</sup>

However, the Chinese ASAT Test in 2007 and the US 2008 response accelerated India’s change in policy from peaceful uses of Outer Space towards supporting militarisation, with the IAF, “arguing for a new aerospace command, seeking extra budget and the necessary infrastructure.”<sup>201</sup> This policy change was exhibited in 2019 when “India became the fourth country to demonstrate a direct-ascent anti-satellite (ASAT) capability in a live test, following the US, Russia and China”.<sup>202</sup>

In recent times, India, like China and Russia, is focusing on reaching the South Lunar pole with its Chandrayaan-3 space craft.<sup>203</sup> As Chapter 1 notes, India successfully completed this mission on 23<sup>rd</sup> August 2023, when Russia had failed to do so earlier. This makes India the fourth State to land on the Moon and notably the first State to land at the lunar South pole.<sup>204</sup> With its recent achievements, India has solidified its status as a significant Space power in modern times.

### 6.8.5 Japan

While China is the prominent State in the context of Asian Outer Space activities, it is closely followed by both Japan and India. Japan, one of the few States “to reach other celestial bodies (such as the Moon and Mars)”,<sup>205</sup> has approached these activities by

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<sup>200</sup> Ibid 358.

<sup>201</sup> Rajeswari Pillai Rajagopalan, ‘India’s Changing Policy on Space Militarization: The Impact of China’s ASAT Test’ (2011) 10(4) *India Review* 354, 364.

<sup>202</sup> Tim Sweijts and Frans Osinga, ‘VIII. Maintaining NATO’s Technological Edge’ (2019) 95(1) *Whitehall Papers* 104, 109.

<sup>203</sup> Nivedita Bhattacharjee, ‘India closes in on moon landing as Russia also races to lunar south pole’ (Reuters, 18 August 2023) <<https://www.reuters.com/technology/space/india-closes-moon-landing-russia-also-races-lunar-south-pole-2023-08-18/>> accessed 19 August 2023.

<sup>204</sup> Mohit Khubchandani, ‘As the First Country to Land on the Moon’s South Pole, Should India Also be the First Space Power to Ratify the Moon Agreement?’ (EJIL: Talk! 13 September 2023) <<https://www.ejiltalk.org/as-the-first-country-to-land-on-the-moons-south-pole-should-india-also-be-the-first-space-power-to-ratify-the-moon-agreement/>> accessed 20 September 2023.

<sup>205</sup> Stefania Paladini, *The New Frontiers of Space: Economic Implications, Security Issues and Evolving Scenarios* (Palgrave Macmillan 2019) 130.

exclusively supporting “national industry to build rockets and probes and engaging less than others in cooperation initiatives.”<sup>206</sup> Thus, the network of Space capabilities that Japan has access to have been entirely domestically-produced and illustrates that Japan has rejected the collaborative approach that many other States have taken to Outer Space activities, as discussed below.

Japan has a vast array of sophisticated satellite technology and “while its space programme has always been strictly civilian, a recent change in the constitution has quietly added ‘national security’ among its aims. After that, Japan was allowed to add spy satellites to its fleet.”<sup>207</sup> This is indicative of the fact that Japan is also engaging in the militarisation of Outer Space, an approach which has also been adopted by India.

#### **6.8.6 North Korea**

The full extent of North Korea’s Outer Space capacities remain unknown, but other States’ reservations regarding what North Korea may do with these capacities drove the passing of Resolution 1718 by the UN Security Council in 2006,<sup>208</sup> which “prohibited North Korea from participating in activities that involved ballistic missiles”.<sup>209</sup> While this resolution did not limit all of North Korea’s Outer Space capacities, it placed the State under restrictions that are not applicable to other Space-faring nations. Nevertheless, in 2009 North Korea raised fears when it was announced that “they were planning to launch a satellite into outer space.”<sup>210</sup> However, the attempted launch was unsuccessful and “the satellite never actually reached orbit.”<sup>211</sup>

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<sup>206</sup> Ibid.

<sup>207</sup> Ibid 131.

<sup>208</sup> United Nations Security Council Resolution 1718, ‘Establishment of a Security Council Sanctions Committee (1718 Committee)’ (14 October 2006) S/RES/1718.

<sup>209</sup> Jennifer Ann Urban, ‘Soft Law: The Key to Security in a Globalized Outer Space’ (2016) 43 *Transportation Law Journal* 33, 40.

<sup>210</sup> Ibid 40-41.

<sup>211</sup> Ibid 41.

While prohibited from launching ABM devices into Outer Space, “North Korea announced that it will continue its outer space activities by placing more satellites in orbit”.<sup>212</sup> As the history of militarization of Outer Space has demonstrated, satellites can be used to gain significant military advantage. Furthermore, as details of the space-faring capabilities of North Korea are not widely known, States such as the United States caution that North Korea’s intended use for Outer Space would likely be militarised.

### **6.8.7 South Korea**

South Korean Outer Space activities began with ballistic missiles in the 1970s, spurred on by “the combination of the Democratic People’s Republic of Korea’s (North Korea) contemporaneous advancements and rising doubts about the reliability of the US security commitment”.<sup>213</sup> After reverse engineering a US ballistic missile, South Korea successfully tested ballistic missiles in 1978 and 1986.<sup>214</sup> From the early 1990s onwards, South Korea’s aim towards establishing itself as a space-faring nation was based on a two-track approach “one relying on foreign technology to manufacture and place in orbit communications satellites, another to foster indigenous technology, starting with small satellites”.<sup>215</sup>

South Korea wanted to become a player in the new Space Race alongside its fellow Asian States such as “China, Japan and India”<sup>216</sup> and by 2010, had indigenously-produced satellites in Outer Space which had been launched through collaborations with other States.<sup>217</sup> In 2008, in collaboration with Russia for the use of a rocket, “the first South

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<sup>212</sup> Ibid 42.

<sup>213</sup> Eligar Sadeh, *The Politics of Space: A Survey* (Taylor & Francis Group 2010) 80.

<sup>214</sup> Ibid.

<sup>215</sup> Won-hwa Park, ‘Recent space developments in South Korea’ (2010) 26 *Space Policy* 117.

<sup>216</sup> Ibid 118.

<sup>217</sup> Ibid.

Korean travelled in outer space...to the International Space Station (ISS) to conduct a series of experiments and promote Korean culture.”<sup>218</sup>

While South Korea’s increased space faring measures from the 1990s onwards were not framed in favour of the militarised uses of Outer Space from the past, South Korea’s recent collaborative relationship with SpaceX saw the launch of “South Korea’s first military communications satellite, called Anasis-II”<sup>219</sup> in July 2020. This could indicate a step in the direction of favouring militarized uses of Outer Space by the moderately-developed Asian Space actor.

#### **6.8.8 Other Global Space-faring States**

Not all Space-faring States have their own launch capacities and thus, carry out their Outer Space activities by collaborating with the States that are equipped with such capacities in order to launch their satellites. An example of this method of interacting with Outer Space is the case of Canada. Canada was one of the earliest Space Powers and launched its satellite, Alouette 1, in 1962.<sup>220</sup> However, Canada no longer uses its own launching systems and collaborates with the US, India and Russia in the launching of its satellites.<sup>221</sup>

In recent times, States have also developed launching facilities having not “actively participated in the past albeit being party to international treaties”.<sup>222</sup> The example of New

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<sup>218</sup> Eligar Sadeh. *The Politics of Space: A Survey* (Taylor & Francis Group, 2010) 82.

<sup>219</sup> Amy Thompson, ‘SpaceX launches South Korea’s 1<sup>st</sup> military satellite, nails rocket landing at sea’ (20 July 2020) Space.com <<https://www.space.com/spacex-launches-south-korean-military-satellite-anasis-2-lands-rocket.html> > accessed 19 December 2020.

<sup>220</sup> Parks Canada Directory of Federal Heritage Designations, ‘Alouette 1 Satellite Programme National Historic Event’ <[https://www.pc.gc.ca/apps/dfhd/page\\_nhs\\_eng.aspx?id=12060#:~:text=Alouette%201%20was%20launched%20on,design%20and%20build%20a%20satellite.>](https://www.pc.gc.ca/apps/dfhd/page_nhs_eng.aspx?id=12060#:~:text=Alouette%201%20was%20launched%20on,design%20and%20build%20a%20satellite.>) accessed 18 August 2023.

<sup>221</sup> Stefania Paladini, *The New Frontiers of Space: Economic Implications, Security Issues and Evolving Scenarios* (Palgrave Macmillan 2019) 134.

<sup>222</sup> Ibid.

Zealand is especially illustrative of this because while it is noted that in recent times, States such as Bangladesh and the UAE have started to engage with the satellite sector, “New Zealand has instead concentrated on another less evident subsegment: launching facilities.”<sup>223</sup> Therefore, New Zealand has taken an opposite approach to Canada by creating launching facilities in order to become a sought out collaborator to launch other States satellites.

The ever-increasing number of State actors in Outer Space, many with active military agendas, creates tension in an environment, which as this chapter illustrates, has grown to be inherently militarised in nature. This tension in Outer Space’s crowded ‘theatre of warfare’ makes the prospect of weaponisation appear incredibly likely, for which weapons regulation legislation must be introduced. As previously noted, Outer Space is an increasingly “congested, competitive and contested”<sup>224</sup> environment. State Space actors, as well as the private Space actors that are discussed in the following section, are vying for their own interests in Outer Space and many of these interests can involve establishing a powerful foothold in Outer Space. As is discussed in this chapter, Outer Space constitutes the ultimate high ground and offers military superiority to Space actors. The more States that have Space objects or are carrying out Space activities, the more that are at risk if weapons use were to occur in Outer Space. It is for this reason that regulation of weapons use in Outer Space is necessary. In addition to the State actors discussed in this section, and many more not mentioned, the ‘theatre of warfare’ of Outer Space has also welcomed the presence of private actors in recent times.

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<sup>223</sup> Ibid 137.

<sup>224</sup> Roger G Harrison, ‘Unpacking the Three C’s: Congested, Competitive, and Contested Space’ (2013) 11 *Astropolitics* 123.

## 6.9 Private Actors in the ‘Theatre of Warfare’ of Outer Space

The addition of private, commercial space actors into the ‘theatre of warfare’ of Outer Space alongside the increasing numbers of space-faring States has resulted in the vast expanses of Outer Space appearing relatively crowded. Furthermore, Hobe notes that with “more actors operating in outer space...governments and more private users seek to benefit from outer space. Evidently, such a considerable increase in the number of users demands more regulation,”<sup>225</sup> such as the regulation for the prospect of weapons use which this research focuses on. However, as is noted in Chapter 5, this will only affect the States responsible for the private actors, despite the increase in private actor space activity.

In the time of the Cold War, when the world witnessed the first entrance of humanity into the realm of Outer Space, “[s]pace activities were strictly government-led, with a strong military foundation, both in what was then the Soviet Union and the United States of America”.<sup>226</sup> During the first Space Race, the activities of both States were predominantly based in public Space bodies. The exception to this was the contribution of hardware manufacture by “[f]irms like Boeing, Chrysler, IBM and McDonnell Douglas”.<sup>227</sup> However, as Hobe emphasises, these private firms “were not the main actors in the government transportation system.”<sup>228</sup> Chaben notes that this “model of public-private cooperation limited the flexibility to innovate in the private space sector, but revealed the technological capacities of the commercial space industry that could revolutionize

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<sup>225</sup> Stephan Hobe, ‘The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of Space-Faring Nations)’ (2010) 15(3 &4) *Uniform Law Review* 869, 881.

<sup>226</sup> *Ibid* 869-870.

<sup>227</sup> *Ibid* 870.

<sup>228</sup> *Ibid*.

American space efforts.”<sup>229</sup> Thus, while private actors had a role to play in the initial ‘Space Age’, this role was merely manufacturing for larger, State bodies, such as NASA. Following on from the Cold War and the success of the Apollo mission, Chaben points out the “stagnation of American efforts to reach new frontiers in space”<sup>230</sup> which was further consolidated by a significant reduction in funding being allocated out of the US budget to NASA and Outer Space exploration efforts. However, it is noted that “NASA’s reduced activity paired with technological innovation by private companies became an ideal recipe for the growth of the private space industry in the United States, a creative, efficient sector that renewed the urge to explore.”<sup>231</sup> Thus, the innovation of private actors during this time would reignite interests in Outer Space, in an exploration-centred phase in which “the competitive nation-based approach that characterized the space race of the Cold War is notably absent”.<sup>232</sup>

In this new, discovery-centred phase of Outer Space exploration, there existed the general recognition of “the value of cooperation in expanding the presence of humankind throughout the solar system”.<sup>233</sup> Thus, when the US Space Shuttle program, which transported astronauts to the International Space Station (hereinafter referred to as the ISS), came to an end, the United States were forced to rely on “Russian space capabilities, as the country’s Soyuz rocket became the only method to send American astronauts to the ISS.”<sup>234</sup>

While this cooperation allowed for the continued delivery of astronauts to the ISS, the US recognised a deficiency in their State-body capacities, that could be filled without

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<sup>229</sup> Jack B Chaben, ‘Extending Humanity’s Reach: A Public-Private Framework for Space Exploration’ (2020) 13(3) *Journal of Strategic Security* 75, 80.

<sup>230</sup> *Ibid* 75.

<sup>231</sup> *Ibid* 81.

<sup>232</sup> *Ibid* 75.

<sup>233</sup> *Ibid* 83.

<sup>234</sup> *Ibid* 84.

requiring excessive funding, by private actors. Space commerce companies not only provided “an alternative to dependence on Russian rockets”<sup>235</sup> through accommodating missions to the ISS, but also “catalysed an entire space economy fuelled largely by burgeoning commercial space industry.”<sup>236</sup> The competition that drove the development of private space actors forward was also the fact that NASA granted the contracts for these collaborative missions “to the companies developing the most cost-effective capabilities.”<sup>237</sup> This, as Chaben notes, was based on the aim of NASA making “private companies responsible for reaching these goals in the most efficient manner possible, with NASA a primary investor and customer”.<sup>238</sup> Only the private actors who found the most cost-effective method to achieve NASA’s goals would be awarded the contract, which allowed NASA to continue to explore Outer Space on a limited State budget. In addition, these contracts provided private actors with “the opportunity to build upon their technologies and refine their processes to ensure the transition from wholly public agency-based missions to routine public-private trips is as seamless as possible.”<sup>239</sup> Thus, the NASA contracts granted private actors the opportunity to gain financial stability and perfect their technology before becoming independent Space actors in their own right.

One of the most prominent private actor collaborators with NASA is currently Space X, whose launch of astronauts to the ISS in May 2020 “marked not only the first commercially constructed and operated manned space flight, but the first time since the Space Shuttle’s retirement that astronauts launched from American soil.”<sup>240</sup> Alongside its NASA collaboration, Space X, also known as the Space Exploration and Technologies

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<sup>235</sup> Ibid.

<sup>236</sup> Ibid.

<sup>237</sup> Ibid 85.

<sup>238</sup> Ibid.

<sup>239</sup> Ibid 86.

<sup>240</sup> Ibid.

Corporation, is the private company dominating the field of space launch services<sup>241</sup> for many other States and their public Space programs, as well as being an independent private actor innovating Outer Space exploration with the world's "first reusable rocket"<sup>242</sup> and since 2019, has been launching Starlink satellites in order to form a satellite mega-constellation.<sup>243</sup>

Thus, through the reinvigoration of the exploration of Outer Space, NASA's system of public-private collaboration has allowed for commercial space actors to emerge, often at the forefront of Outer Space activities and ahead of many Space-faring States. Private actors working independently, such as Blue Origin<sup>244</sup> and Virgin Galactic,<sup>245</sup> are advancing the prospect of 'space tourism' in flights bringing passengers into or to the edge of Space. However, these actions of private actors is changing the nature of the 'theatre of warfare' of Outer Space, particularly those 'space tourism' efforts because this introduces the prospect of introducing tourists into Outer Space. This possibility increases the need for weapons regulation because if an armed conflict were to break out in Outer Space, these 'Space tourists' would be civilians. In particular, from the perspective of the principle of humanity, reducing the unnecessary suffering and superfluous injury of humankind would no longer just apply to astronauts or those on Earth, but also to humans being introduced to the edge or/into Outer Space on a temporary, tourist nature. This consideration of the possible unnecessary suffering of humans that could be in Space, as

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<sup>241</sup> Christina Isnardi, 'Problems with Enforcing International Space Law on Private Actors' (2020) 58 *Columbia Journal of Transnational Law* 489, 496.

<sup>242</sup> *Ibid.*

<sup>243</sup> Jonathan C. McDowell, 'The Low Earth Orbit Satellite Population and Impacts of the SpaceX Starlink Constellation' (2020) 892 *The Astrophysical Journal Letters* 1.

<sup>244</sup> William Harwood, 'Blue Origin launches six passengers on supersonic flight to the edge of space' (4 August 2022) <<https://www.cbsnews.com/news/blue-origin-launches-six-passengers-on-supersonic-flight-to-the-edge-of-space/#:~:text=Bezos%2C%20his%20brother%20Mark%2C%20aviation,nine%20days%20after%20Branson%27s%20launch.>> accessed 19 August 2023.

<sup>245</sup> Thomas Mackintosh, 'Virgin Galactic: First space tourism mission after decades of promises' (10 August 2023) <<https://www.bbc.com/news/science-environment-66468628> > accessed 19 August 2023.

well as humankind as a whole, is considered in this research through the use of the lens of humanity to form recommendations for the regulation of the use of weapons in Outer Space.

These increase in the number of actors in Outer Space, but as is discussed in Chapter 5, not all activities of all actors are regulated equally. Furthermore, the “progress of companies like SpaceX, Blue Origin, and Boeing reveal to the world the increasingly seminal role of commercial space industry”<sup>246</sup> which is not catered for in the state-centric space law instruments because there are many private actors that, as Robison observes, “have already begun to pursue endeavours without government involvement.”<sup>247</sup> Thus, there is no State supervising some private Space actors to which responsibility for the actions of the private actor is allocated.

Thus, the activities of private actors are not subject to the same regulation as the activities of an increasing number of State actors in the ‘theatre of warfare’ Outer Space and as Robison notes, “[d]ifficulties associated with more actors in outer space are only exacerbated with the monumental shift of space activities from the hands of government to the hands of private space companies that are quickly spanning across the globe.”<sup>248</sup> As Chapter 5 notes, while ISL may not apply to private actors, private actors are dealt with in IHL. In instances where the private actors in an armed conflict situation are hired by a party to an armed conflict, they are considered as mercenaries. Alternatively, if private actors are participating in the conduct of hostilities of their own accord, they may be considered as a non-state armed group. This research submits that if an armed conflict and with it, weapons use, were to occur in Outer Space, considerations of how privates

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<sup>246</sup> Jack B Chaben, ‘Extending Humanity’s Reach: A Public-Private Framework for Space Exploration’ (2020) 13(3) *Journal of Strategic Security* 75, 96.

<sup>247</sup> Christian Joseph Robison, ‘Changing Responsibility of a Changing Environment: Reevaluating the Traditional Interpretation of Article VI of the Outer Space Treaty in Light of Private Industry’ (2020) 5(1) *University of Bologna Law Review* 1, 3.

<sup>248</sup> *Ibid* 12.

actors would be categorised if they were involved in the hostilities must be included in considerations of the recommendations. The tensions of States are increasing in the midst of escalated militarisation among an increased number of actors, both State and private; and if the prospect of weaponisation is to be stemmed as a reaction mechanism for States trying to achieve their objectives in this tense environment, express weapons regulation must be introduced, for which this research forms recommendations.

## **6.10 Conclusion**

This chapter provides a contextual analysis of the current militarised environment of Outer Space as a ‘theatre of warfare’, which contributes to this research by highlighting the urgency of the need to put regulation of the use of weapons in Outer Space in place, recommendations for which are formed by this research through the lens of the principle of humanity in IHL. Section 6.1 addresses the status of ‘theatre of warfare’ and analysis what this categorisation attributes to Outer Space, with Section 6.2 outlining the implications of this categorisation as a ‘theatre of warfare’. Section 6.3 discusses Space Security, while Section 6.4 follows with examining the difference between militarisation and weaponisation, both of which pose a threat to Space Security. Section 6.5 presents a timeline of the activities that contributed to the militarisation of Outer Space. This timeline illustrates the increasing need to address the regulation of the use of weapons in Outer Space, which this research does, as militarisation is increasing and growing closer to becoming weaponisation. Section 6.6 analyses the ‘Space weapons’ that exist in States’ military arsenals, with the focus of this research, and the recommendations that it forms, being on kinetic weapons. Kinetic weapons pose the most immediate risk with regards to causing unnecessary suffering, which as Chapter 2 discusses, is what the principle of humanity, as this research defines it, seeks to prevent. Thus, the formation of

recommendations for weapons regulation through the lens of the principle of humanity would be most effective in reducing unnecessary suffering by focusing on kinetic weapons. In addition, the principle of humanity is chosen as the lens for this research as it instils the considerations of humankind into IHL. The use of kinetic weapons, and the consequences of this use, poses the most immediate risk to humankind as a whole. Following on from the analysis of weapons, Section 6.7 outlines the advantage for States in gaining power in Outer Space. It is the potential to obtain the ultimate high ground that is Outer Space that could entice States to use weapons, and this weapons use would currently be unregulated due to the gap in the IHL and ISL frameworks. This illustrates the need to address this gap in Outer Space weapons regulation, as this research does. Following on from the discussion of the advantage that Outer Space offers, Section 6.8 and 6.9 outline both the State and private Space actors, many of whom are competing for the aforementioned advantage. The more competitive Outer Space becomes, the higher tensions are and the more likely it is that an armed conflict in Outer Space would occur.

While the weaponisation of Outer Space has yet to occur, the acceleration of militarised practices in Outer Space from humanity's first interaction with the celestial environment until the present illustrates the development of Outer Space as a 'theatre of warfare', with NATO's 2019 London Declaration merely confirming what many Space-faring States already knew to be true. In addition, the space weapons that are known to exist in States' military arsenals also consolidate Outer Space's status of a 'theatre of warfare' as the weapons are ready for use should an armed conflict arise. The number of Space-faring States and private actors has increased drastically in recent times and this creates tension within a militarised, international environment wholly different from that which played host to the first Space Race. Therefore, the categorisation of Outer Space as a 'theatre of warfare' is an unsurprising event. This research argues that it does however present an

opportunity for the creation of an IHL weapons regulation instrument to attempt to secure some level of security in Outer Space and regulation between all of these Space actors. It is in the interest of all parties involved, as well as the majority of humankind, Earth-bound and vulnerable, to create regulations for military operations in the ‘theatre of warfare’ in Outer Space, recommendations for which this research forms. These recommendations are outlined in the following chapter.

## Chapter 7: Conclusions & Recommendations

### 7.0 Introduction

As has been established in this research, activity in Outer Space is ever-increasing and some of this activity involves weapons use. While Outer Space is not considered to be weaponised as of yet, Earth-to-Space weapons use has been witnessed and other ‘Space weapons’ technologies exist. Furthermore, the capabilities of conventional weapons to function in Outer Space means that many States already possess weapons that can be used in Outer Space in their military arsenals. The use of these weapons in Outer Space is not sufficiently addressed in the ISL or IHL frameworks. ISL only prohibits the placement of nuclear weapons and weapons of mass destruction in Outer Space while existing IHL instruments are not tailored to the Outer Space environment. With this context in mind, this chapter draws on the analyses and conclusions of the preceding chapters of the thesis to answer the following central research question and research sub-questions, which were outlined in Chapter 1 of the thesis:

**How can the principle of humanity, a recognised key principle of IHL, be utilised to form recommendations for the regulation of the use of weapons in Outer Space?**

1. What is the current legal regime for the regulation of weapons in Outer Space?
2. What is missing in the legal regime for the regulation of weapons in Outer Space?
3. What is the role of the principle of humanity in weapons regulation?

How the chapters of the thesis have contributed towards answering these research questions is outlined in the following summary.

## 7.1 Summary of Thesis

In order to answer the research question and sub-questions, this research investigated both the IHL and ISL frameworks across seven chapters, to ascertain and critique the legal regime applicable to weapons regulation in Outer Space.

In Chapter 1, the topic of the research was introduced and the contextual background for this research topic was provided. The central research question and sub-questions which the research sought to answer were outlined. The significance of the research to the current state of the art was also described, focusing on the lens of the principle of humanity in IHL as the unique perspective that this research adds to the existing literature. Finally, the descriptive-normative methodology adopted during this research and the rationale for choosing this research approach was explained.

Chapter 2 introduced the Principle of Humanity in IHL as the lens of this research, informing the answer of the third research sub-question. This lens was chosen because it is the foundation of IHL.<sup>1</sup> The long history of limiting the amount of unnecessary suffering in armed conflict was also illustrated in Chapter 2, aligning with the aim of the principle. The definition that this research used for the principle of humanity was then provided. While other meanings have arisen in general and in law for the term ‘humanity’ such as reference to humankind as a whole or to a sense of moral action towards other humans, the definition that this research adopted is rooted in IHL. Thus, this research defined the principle of humanity as limiting the means and methods of warfare that can be employed during an armed conflict and seeking to reduce unnecessary suffering and superfluous injury in the conduct of hostilities. The role of the Martens Clause, introduced

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<sup>1</sup> Ryan J. Vogel, ‘Drone Warfare and the Law of Armed Conflict’ (2010) 39(1) *Denver Journal of International Law and Policy* 101, 127-128: “[t]he principle of humanity may be understood as the capstone of the other constraining principles”.

in the 1899 Hague Convention II,<sup>2</sup> and adopted in numerous IHL instruments that followed, provides that the principle of humanity is the minimum standard for protection in instances in armed conflicts not expressly provided for in IHL instruments. It was also emphasised that while the Martens Clause consolidates the role of the principle of humanity as this minimum standard of protection, the two are not synonymous. The principle of humanity, particularly the elements of placing limitations on the means and methods of warfare and mitigating unnecessary suffering and superfluous injury, is also incorporated in IHL instruments independent of the Martens Clause. This illustrates the continued relevance of the principle of humanity in IHL. Overall, Chapter 2 emphasised the centrality of the principle of humanity to IHL in providing the foundation for the other principles and IHL aims in general and also setting the minimum standard of protection in the absence of express IHL regulation. Thus, it is logical that this principle, the centre of IHL, provided the lens for the recommendations that this research forms.

In Chapter 3, the regulation of conflict and the aims of the IHL framework were discussed with a view to providing the context of one of the bodies of law in which the regulatory instrument for which this research forms recommendations is placed. The body of law that is *jus in bello* was distinguished from other related but separate bodies of law that are *jus ad bellum* and *jus post bellum*. Chapter 3 provided an overview of the aims and principles of IHL and how central the principle of humanity is to the body of law, as this illustrates the legal environment which was considered when forming recommendations for a new IHL instrument. Finally, Chapter 3 also analysed other important sources of law within the IHL framework – customary IHL, case law and a more utilised option in more recent times, soft law instruments. This outlined the current sources in the body of law which provides for the regulation of weapons and is illustrative of the forms that a

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<sup>2</sup> 1899 Hague Convention II.

proposed IHL instrument can take, which informed the recommendations made by this research. Establishing the basis of comprehension of IHL as a body of law was instrumental in answering the first and second research sub-questions because knowledge of IHL is essential to the understanding of weapons regulation, as well as the role of the principle of humanity in weapons regulation.

Weapons Regulation in IHL was analysed in Chapter 4, starting with theories of both regulation in general and weapons regulation in practice and seeing if links could be established between theory and the weapons regulation framework in IHL. Furthermore, the need for weapons regulation instruments, in light of the IHL framework and the principles upon which it hinges as discussed in Chapter 3, was examined with issues that arise in spite of the existence of the IHL framework, such as States continued ‘total war’ approach towards armed conflict and the constant emergence of new weapons technologies discussed as examples. The different approaches to weapons regulation in IHL were investigated. The approaches of prohibiting a weapons use entirely or limiting a weapons use in certain ways or contexts were identified within the IHL framework. Additionally, the steps that can accompany a weapons prohibition, such as non-proliferation or a strategy of disarmament were discussed, as well as exploring the concept of whether deterrence, previously seen in a nuclear weapons context but often cited in reference to Outer Space weapons use, could be considered an effective means of weapons regulation. Some of the weapons regulation instruments in the IHL framework were analysed in order to identify patterns which served as valuable information for this research’s formation of recommendations for a weapons regulation instrument and similarly, with IHL’s recent tendency to adopt soft-law instruments, expert manuals, some of which focus on the context of Outer Space, were examined. Finally, a summary looking

at why weapons are regulated in a certain way and the role that State's political and security interests have in affecting these regulatory choices was provided.

Chapter 5 provided an overview of the ISL framework, beginning with a general summary of the laws of Outer Space that apply, including at domestic, regional and international levels, as well as discussing the State and private actors that conduct activities in Outer Space. The analysis of the UN space law framework began with declarations made by the UN GA which addressed issues in Outer Space, some of which served as inspiration for the binding UN space law instruments that would follow. The five treaties in the UN ISL framework, introduced during the 'Space Race' of the Cold War period and not expanded upon since this period, were discussed with the 1967 Outer Space Treaty<sup>3</sup> remaining the foundational instrument in international space law today. The examination of these instruments provided essential information for the first and second research questions because some of these instruments, particularly the 1967 Outer Space Treaty,<sup>4</sup> include the existing limitations placed on weapons use in Outer Space and from these instruments, the gaps in the existing framework can also be identified. Certain elements of the space law framework, such as the use of Outer Space for peaceful purposes and the allocation of the category of province of mankind to Outer Space were discussed in relation to their relevance for the formation of recommendations for weapons regulation in Outer Space conducted in this research. In relation to this, the weapons regulation instruments that do exist in the space law framework, as well as attempts at such instruments, were examined. Finally, Chapter 5 discussed customary space law and the gaps in the existing space law framework, all of which provided an overview of the context in which the

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<sup>3</sup> 1967 Outer Space Treaty.

<sup>4</sup> Ibid.

recommendations from this research are placed as a hybrid IHL/ISL weapons regulation instrument.

The nature of Outer Space as a ‘theatre of warfare’ was investigated in Chapter 6 to discuss the militarised nature of Outer Space and highlight the imminence of weapons use in Outer Space in this tense, militarised environment. The announcement by NATO of Outer Space as one of its five ‘operational domains’ sparked discussion over Outer Space becoming the next ‘theatre of warfare’ but it was unclear as to what this status meant. Chapter 6 looked into operational law in the conduct of hostilities to find further clarity and while NATO may have been updating its operational domains to keep up-to-date with the capabilities of its allies, the announcement sparked increased militarisation, a process which began with humankind’s first interactions with Outer Space, as the chapter illustrated. Chapter 6 then investigated what the existing and potential ‘space weapons’ are, with the focus of this research being on kinetic weapons. Finally, in this tense, crowded and militarised environment, the actors, both State-based and private, that operate Outer Space activities were discussed with regards to their contribution to this dangerous environment. The analysis of Chapter 6 contributed important context to the answering of the first and second research sub-questions, as well as that of the overall research question, by highlighting the urgency of the need to address the weapons regulation framework and the gaps therein in respect of Outer Space.

## **7.2 Conclusions**

From the analysis conducted in the thesis chapters outlined in the previous section, the following conclusion were drawn. These conclusions contribute to the answering of the central research question and research sub-questions of this thesis.

**1. A gap exists in the current legal regime for the regulation of weapons in Outer Space.** As Chapter 5 established, the primary weapons regulation provision in the ISL framework is Article IV of the 1967 Outer Space Treaty,<sup>5</sup> which prohibits the placement of nuclear weapons and weapons of mass destruction in orbit, as well as stationing them on celestial bodies. Outside of this provision, which essentially integrated the prohibition of the Limited Test Ban Treaty,<sup>6</sup> the Anti-Ballistic Missile Treaty<sup>7</sup> existed between the United States and Russia, until the withdrawal of the United States. This is the extent of the binding weapons regulation measures within the ISL framework. While the weapons regulation instruments outlined in Chapter 4 of the thesis will apply if an armed conflict in Outer Space occurs, these instruments are not tailored to the specifics of the Outer Space environment and weapons use therein. Thus, at the intersection of the ISL and IHL frameworks, there is a gap with respect to regulation that deals with weapons use in Outer Space, as highlighted in the second research sub-question.

**2. The principle of humanity has been and remains central to the IHL framework and thus, constitutes the appropriate lens for this research.** The principle which forms the foundation of the IHL framework,<sup>8</sup> as established in Chapter 2, continues to be included in IHL instruments through the Martens Clause<sup>9</sup> as well as its interpretation as placing limitations on the choice of means and methods of warfare and the limiting of unnecessary suffering and superfluous injury. The inclusion of these elements of the principle in the definition adopted for the purposes of this research, outlined in Chapter 2, are central to weapons regulation practices and thus, consolidate the need for this lens

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<sup>5</sup> Ibid art IV.

<sup>6</sup> 1963 Limited Test Ban Treaty.

<sup>7</sup> 1972 Anti-Ballistic Missile Treaty.

<sup>8</sup> Ryan J. Vogel, 'Drone Warfare and the Law of Armed Conflict' (2010) 39(1) Denver Journal of International Law and Policy 101, 127-128.

<sup>9</sup> 1899 Hague Convention (II), preamble.

in forming recommendations for a weapons regulation instrument. These elements also help to answer the third research sub-question by highlighting that the role of the principle of humanity in weapons regulation is to limit the choice of weapons for the parties to the armed conflict and also to establish that parties to the armed conflict should make choices that limit suffering and injury as much as is practicable.

While the other interpretations of the meaning of ‘humanity’ are not adopted for this research, it is suggested that they nevertheless inform considerations associated with the principle of humanity and also with features of this research. The moral interpretation of humanity can be linked with the protection of those not actively participating in hostilities, as well as limiting the suffering of those who are. As noted, this is the role of the principle of humanity in weapons regulation. Furthermore, in the case of Outer Space, the consequences of weapons use in Outer Space will be experienced by humankind as a whole, the other interpretation of humanity. While not all included in the IHL definition of the principle of humanity, the interpretations of ‘humanity’ are nevertheless linked and serve to inform the impact of the principle in practice.

As noted, these interpretations link to the consequences that could arise as a result of weapons use in Outer Space and further emphasise the need for this research and the recommendations that it forms from the principle of humanity perspective. The central research question of this thesis inquires as to how the principle of humanity can be utilised to form recommendations and the author concludes that the principle can be utilised by focusing the recommendations of this research on the formation of an instrument which seeks to reduce the possibility of unnecessary suffering and superfluous injury that weapons use in Outer Space poses to humankind at large – those who may be civilians in Outer Space or those on Earth while weapons use occurs above.

**3. Through the investigation of weapons regulation instruments conducted in Chapter 3, it is gathered that the focus for regulation has predominantly been on the characteristics of the weapons as opposed to the domain of use of the weapons.** This is the case with the majority of weapons regulation instruments to-date in IHL. The prevalent focus identified in weapons regulation instruments is that of ascertaining whether a weapon, either inherently or its use in a certain way, unnecessarily aggravates suffering or injury more than is required to achieve a military advantage.<sup>10</sup> The few weapons that are already prohibited from being placed in Outer Space, nuclear weapons and weapons of mass destruction, follow this pattern of regulation due to their specific characteristics.

However, it has been concluded in this research that weapons that can be used in Outer Space are not just ‘Space weapons’ that are technologically designed for this domain of use, but also conventional weapons. Therefore, considerations for regulation would need to focus on more than just the characteristics of weapons, as weapons that can be used in Outer Space span different weapons categories. It is suggested that an alternative approach to weapons regulation be adopted – one which focuses on the domain of use as opposed to the characteristics of the weapons themselves. It is noted by Dinstein that the use of a weapon in a specific domain could be limited because “the salient problem often is use of a weapon in a particular setting, rather than its original characteristics.”<sup>11</sup>

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<sup>10</sup> Gary D Solis, *The Law of Armed Conflict: International Humanitarian Law in War* (Cambridge University Press 2010) 270: “increase suffering without increasing military advantage”. Emily Crawford and Alison Pert, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020) 197: “these injuries are excessive in relation to the military advantage achieved”. See also *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996, para 78; suffering described as “[a] harm greater than that unavoidable to achieve legitimate military objectives”.

<sup>11</sup> Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict* (2<sup>nd</sup> edn, Cambridge University Press 2010) 62.

This would not be an entirely new approach to weapons regulation as it is seen in Protocol II to the 1980 CCW with regards to the placement of mines and booby traps.<sup>12</sup> An additional example is that of the Political Declaration on Strengthening the Protection of Civilians from the Humanitarian Consequences Arising from the Use of Explosive Weapons in Populated Areas,<sup>13</sup> which was adopted by over 80 States on 18<sup>th</sup> November 2022. This declaration aims to build upon this area of concern which was highlighted most prominently in September 2019 in a joint appeal made by the UN Secretary General and the President of the ICRC.<sup>14</sup> This appeal emphasised the impact felt by civilian populations as a result of the use of explosive weapons in urban areas and the unnecessary and intense suffering caused as a result of this weapons use serves to underscore the fact that “[p]arties to conflict should recognize that they cannot fight in populated areas in the way they would in open battlefields.”<sup>15</sup> This need for parties to an armed conflict to adapt to the environment or domain in which the conflict is taking place is equally as applicable to weapons use in Outer Space as it is to explosive weapons use in urban and populated areas.

The focus on the environment of the warfare in the Political Declaration is notable, despite the fact that a Political Declaration is a different type of instrument than the legally-binding instrument that this research recommends. As Grego notes “[a]rms control could take a number of forms, including legally- or politically-binding multilateral

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<sup>12</sup> 1980 Protocol II to the 1980 Convention on Certain Conventional Weapons, art 3(3)(a).

<sup>13</sup> ‘Political Declaration on Strengthening the Protection of Civilians from the Humanitarian Consequences arising from the use of Explosive Weapons in Populated Areas’ (Department of Foreign Affairs, 18 November 2022) < <https://www.dfa.ie/our-role-policies/international-priorities/peace-and-security/ewipa-consultations/> > accessed 17 February 2023.

<sup>14</sup> Secretary General of the United Nations, Antonio Guterres, and the President of the ICRC, Peter Maurer, ‘Explosive Weapons in Cities: Civilian devastation and suffering must stop’ (ICRC, 18 September 2019) <<https://www.icrc.org/en/document/explosive-weapons-cities-civilian-devastation-and-suffering-must-stop> > accessed 10 May 2022.

<sup>15</sup> Ibid.

agreements”,<sup>16</sup> and therefore, this Political Declaration does signal positive steps. Furthermore, the approach also aligns with that suggested – environment-focused as opposed to weapons characteristic-focused weapons regulation. This conclusion contributes towards answering the second research sub-question by identifying something that is missing in the current regime for weapons regulation in Outer Space and that is an approach that addresses all of the possible weapons that could be used in Outer Space.

**4. Following on from this conclusion in which a political declaration is discussed, it is recognised that in both the IHL and ISL frameworks, including in relation to weapons regulation, soft law is increasingly being utilised to address legal issues as opposed to binding, hard-law instruments.** As discussed in Chapter 3, soft law has been contributing to IHL increasingly and this author is of the opinion that soft law has a key role to play in IHL, such as constituting the first steps towards binding legislation, as well as having a role to play in gaining consensus. For example, the creation of expert manuals in IHL summarises the *lex lata* on particular issues or areas of IHL. There are two such projects already focusing on military activities in Outer Space with the McGill Manual and the Woomera Manual.

With these projects already in place, it is thus concluded that this research should not recommend the formation of a similar instrument. This would not serve to address a gap in the existing regime that regulates the use of weapons in Outer Space as outlined in the second research sub-question because similar efforts are already being made. Nevertheless, it is concluded that the work so far on these projects is illustrative of the concern of States with regard to the area of Outer Space and possibly, an increase in the

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<sup>16</sup> Laura Grego, ‘The Case for Space Arms Control’ in Melissa de Zwart and Stacey Henderson (eds), *Commercial and Military Uses of Outer Space* (Springer 2021) 88.

momentum of steps towards regulations. This could mean that it is an appropriate time to re-visit binding options, as will be discussed in recommendations.

**5. The activities in Outer Space are growing more hostile in nature and that the time to address weapons use in Outer Space is now.** It is argued that what originally began as Space exploration, while militarised and politicised in nature, during the 1950s-60s has escalated in nature in recent times. The Artemis mission aim of establishing human habitation in Outer Space<sup>17</sup> could be questioned in relation to its compliance with Article II of the 1967 Outer Space Treaty. This Article provides that “[o]uter 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.”<sup>18</sup> Despite the collaborative nature of the mission with other States and Space actors, whether it would constitute appropriation of the Moon is questionable and how access to the Moon by non-Artemis States, after the mission’s completion is equally unknown. In addition, the recent demonstration of Space power by India with its moon landing and moreover, its success after Russia’s failure,<sup>19</sup> shows that the competitive element of the ‘Space Race’ is very much still alive.

These recent Space missions are more than just exploration – they are establishing power ahead of other Space-faring and non-Space-faring States, not dissimilar to the original Space Race. With power gains and losses at risk, tensions between States in this domain

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<sup>17</sup> Stacey Henderson and Melissa de Zwart, ‘Returning Humans to the Moon’ in Melissa de Zwart, Stacey Henderson, John Culton, Deborah Turnbull and Amit Srivastava (eds), *Human Uses of Outer Space: Return to the Moon* (Springer 2023) 1: “[w]ith the Artemis missions, the US and its partners plan to create the Lunar Gateway, to be followed by the landing of the first woman and next man on the Moon (NASA, 2021). The Artemis project will then form the basis of planned, sustained human missions to Mars.”

<sup>18</sup> 1967 Outer Space Treaty, art II.

<sup>19</sup> Christopher Newman, ‘India has landed on the Moon: here’s what the political and economic gains are’ (The Conversation, 30 August 2023) <<https://theconversation.com/india-has-landed-on-the-moon-heres-what-the-political-and-economic-gains-are-212313>> accessed 31 August 2023.

will only continue to increase. Addressing the gap that is weapons regulation with regards to Outer Space is more important than ever as Outer Space grows more hostile.

Based upon these conclusions and in response to the second research sub-question of this thesis, a sufficient weapons regulation instrument to address the escalating risk in the hostile Outer Space environment is missing in the legal regime. In reply to the third research sub-question, the role of the principle of humanity in weapons regulation is to limit the weapons that can be used in armed conflict and to reduce unnecessary suffering and superfluous injury resulting from weapons use. Recommendations for a weapons regulation instrument addressing weapons use in Outer Space will be formed in the following section.

### **7.3 Recommendations**

Both general and specific recommendations were formed to address the regulation of the use of weapons in Outer Space. The general recommendations, based on the principle of humanity, are addressed first, with specific recommendations relating to the form and the drafting of the proposed weapons regulation instrument following from the third recommendation.

#### **1. An IHL instrument should be adopted to regulate the use of weapons in Outer Space.**

At present, the limitations on weapons use in Article IV of the 1967 Outer Space Treaty,<sup>20</sup> as well as the application of existing IHL,<sup>21</sup> do not offer sufficient protection. The current

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<sup>20</sup> 1967 Outer Space Treaty, art IV.

<sup>21</sup> Ibid art III.

legal regime with regards to weapons use in Outer Space is sparse, especially with the ‘Space weapons’ capabilities that exist and the increasingly militarised nature of the Outer Space environment, as established in Chapter 4. The current gap at the intersection of the ISL and IHL frameworks is addressed by the minimum standard of the principle of humanity, as provided for in the Martens Clause of the 1899 Hague Convention II.<sup>22</sup>

As a weapons regulation instrument, the recommended instrument would apply from the outbreak of an armed conflict in Outer Space and apply until the end of an armed conflict. The provisions of the instrument would apply equally to parties to the armed conflict, regardless of the role or rationale of the parties in relation to the outbreak of the conflict.

Being formed from the lens of the principle of humanity, the instrument should be drafted with the aim of reducing the unnecessary suffering and superfluous injury of humans, including the combatants involved, any civilian personnel in Outer Space and also, humankind as a whole on Earth.

## **2. The form of weapons regulation adopted in the instrument should be a limitation on weapons use as opposed to a prohibition of weapons use.**

First, while the principle of humanity, in aiming to reduce unnecessary suffering, would be most effectively achieved by a weapons prohibition, which bans the use of weapons in Outer Space completely, such an instrument has been proposed with the draft PPWT before the Committee on Disarmament by Russia and China in 2008<sup>23</sup> and 2014.<sup>24</sup> Thus, this research proposes a weapons limitation approach – to limit certain uses of weapons in Outer Space or their use in particular contexts, but not prohibit their use outright.

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<sup>22</sup> 1899 Hague Convention (II), preamble.

<sup>23</sup> 2008 Draft PPWT.

<sup>24</sup> 2014 Draft PPWT.

The proposals for a prohibition would align the most with the principle of humanity aims but has not only reached a political stalemate; it also comes from a perspective that weapons are not currently in Outer Space. The draft Treaty focuses on the prevent of the placement of weapons in Outer Space. While there may not be space weapons ‘in’ Space presently, such as a co-orbital anti-satellite weapon, as Chapter 6 illustrates, States possess those capabilities. Furthermore, the use of weapons from Earth to Space in the form of direct ascent anti-satellite has been demonstrated already and despite the moratorium on anti-satellite testing for space-debris purposes,<sup>25</sup> can still occur. Thus, while weapons are not ‘placed’ in space currently, it is arguable that space is an area in which weapons have up until this point been used, particularly kinetic weapons, which as Chapter 6 highlights, are the central space weapon capable to causing injury or fatality to persons due to their kinetic nature.

For this reason a limitation on weapons use, which does still align with the principle of humanity in seeking to reduce unnecessary suffering is recommended because (i) it recognises the reality of the ‘theatre of warfare’ that is Outer Space at present, where weapons use to that domain does occur and capabilities for weapons to be placed in Space already exist, which makes the prevention of an arms race or the prohibition of placement seem outdated; (ii) if a prohibition has caused a stalemate, a limitation instrument may garner more support as it is less restrictive while still aiming to reduce unnecessary suffering and superfluous injury; (iii) the suffering and injury that could be caused by weapons use in Outer Space increases the closer it comes to Space introducing more

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<sup>25</sup> Heather Foye and Gabriela Rosa Hernández, ‘UN First Committee Calls for ASAT Test Ban’ (Arms Control Association, December 2022) <[343](https://www.armscontrol.org/act/2022-12/news/un-first-committee-calls-asat-test-ban#:~:text=The%20United%20States%20launched%20its,of%20debris%20to%20litter%20space.> accessed 3 September 2023: “[t]he United States launched its ASAT testing ban initiative following a Russian test in November 2021”.</a></p></div><div data-bbox=)

humans into Outer Space, whether through tourism or habitation plans; (iv) injury and suffering to those in Outer Space will not be the only concern forever, as if weapons capabilities that can act ‘in’ Space are already in States military arsenals, the likelihood of Space-to-Earth weapons grows nearer, which poses risk to humankind as a whole with respect to injury and suffering, as does the use of weapons in Outer Space in general. It is for these reasons and the risks that pose through the lens of the principle of humanity that weapons regulation, in this instance, limitation measure as opposed to prohibition is recommended.

**3. The form that this weapons regulation instrument should take should be a binding instrument, as opposed to soft law, and should also be independent, as opposed to being introduced as a Protocol to the 1980 CCW.<sup>26</sup>**

(a) Chapter 3 highlights soft-law projects that are on-going with regards to addressing the law applicable to military operations in Outer Space, such as the McGill Manual and the Woomera Manual. These expert manuals provide a summary of the *lex lata*, as opposed to forming recommendations for the *lex ferenda*, which is what this research aims to do. As noted by Kreps with regards to elements to consider in drafting arms control agreements, it is noted that “legalization can be attractive for coping with future uncertainty”<sup>27</sup> but “[l]ower-obligation, non-binding agreements give states an off-ramp if circumstances change in the future”.<sup>28</sup> Thus, a soft-law instrument would likely garner more State support as it restricts their sovereignty less, particularly States such as the United States that claim there is no arms race in Outer Space.<sup>29</sup> However, as the analysis

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<sup>26</sup> 1980 Convention on Certain Conventional Weapons.

<sup>27</sup> Sarah E. Kreps, ‘The Institutional Design of Arms Control Agreements’ (2018) 14 Foreign Policy Analysis 127, 129.

<sup>28</sup> Ibid.

<sup>29</sup> Laura Grego, ‘The Case for Space Arms Control’ in Melissa de Zwart and Stacey Henderson (eds) *Commercial and Military Uses of Outer Space* (Springer 2021) 89: “[t]he United States has stated that it

of weapons regulation instruments in Chapter 4 illustrate, the 2017 Treaty on the Prohibition of Nuclear Weapons<sup>30</sup> serves as an example of a binding weapons regulation instrument that successfully entered into force without ratification by the nuclear States of the United States or Russia. This was a significant achievement by States that would have been predominantly non-nuclear States in the 1968 NPT.<sup>31</sup> It is not a dissimilar situation to that in Outer Space where there are those States that have Space-faring capabilities and those States that do not, because these States still have interests in maintaining peace in Outer Space to ensure the stable functioning of their societies through uninterrupted receipt of satellite information. Thus, the formation of binding law without the involvement of more powerful States is possible and has been witnessed in recent times. It is for this reason that this research recommends a binding instrument, which would be the strongest legal instrument to address the gap in the regime of weapons regulation in Outer Space.

(b) As Chapter 6 notes with regards to ASAT weapons, the weapons technologies which are capable of use in Outer Space are conventional weapons. Furthermore, the on-going discussion in weapons regulation spheres around the need to regulate the use of Lethal Autonomous Weapons (hereinafter referred to as LAWs) recognises that “[t]he 1980 Convention on Prohibitions or Restrictions on Use of Certain Conventional Weapons could be amended to cover LAWs”,<sup>32</sup> with LAWs referring to fully autonomous weapons.

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does not believe there is an arms race in space and see little value in this treaty” in reference to the draft Treaty on the Prevention of the Placement or the Threat or Use of Weapons in Outer Space.

<sup>30</sup> 2017 Treaty on the Prohibition of Nuclear Weapons

<sup>31</sup> 1968 Non-Proliferation Treaty.

<sup>32</sup> Jay Logan Rogers, ‘Lethal Judgment Day for the Rise of the Machines: A National Approach to Regulating Fully Autonomous Weapons’ (2014) 56(4) *Arizona Law Review* 1257, 1271-1272.

Reeves, Alcala, and McCarthy outline that the novelty of a particular weapons technology holds influence over its regulation. It is noted that “in general, weapons with an identifiable ancestry are less likely to be suppressed than novel military technologies”,<sup>33</sup> a view that Watts puts forward.<sup>34</sup> Thus, novel military technologies are likely to be subject to regulation or prohibition and likely under an individual instrument as priority. However, for certain weapons technologies that are deemed as conventional or to have been developed as a natural progression from existing weapons technologies, the inclination may not be as pressing to regulate them and likely not in their own instrument. Along this line of thought, what Crootof describes as a “passive wait and-see approach”<sup>35</sup> may be adopted with regards to the regulation of conventional weapons technologies that can be used in Outer Space. If this approach is adopted, the likelihood of eventual regulation taking the form of a Protocol being annexed to the 1980 CCW<sup>36</sup> would be greater as the novelty of these weapons would be lower and perhaps, depending on whether their use in Outer Space has occurred during the ‘wait and see period’, they may not be deemed injurious enough to warrant an individual weapons regulation instrument.

However, this thesis recommends an individual weapons regulation instrument for weapons capable of use in Outer Space as soon as is practicable – essentially adopting what Crootof describes as “proactive regulation in the international humanitarian law

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<sup>33</sup> Shane R. Reeves, Ronald T. P. Alcala and Amy McCarthy, ‘Challenges in Regulating Lethal Autonomous Weapons under International Law’ (2021) 27(1) *Southwestern Journal of International Law* 101, 112.

<sup>34</sup> Sean Watts, ‘Regulation-Tolerant Weapons, Regulation-Resistant Weapons and the Law of War’ (2015) 91 *International Law Studies* 540, 612-613.

<sup>35</sup> Rebecca Crootof, ‘Regulating New Weapons Technology’ (June 14, 2018) in ‘The Impact of Emerging Technologies on the Law of Armed Conflict’ by Eric Talbot Jensen & Ronald T.P. Alcala (eds) (Oxford University Press 2019 forthcoming) <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3195980](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3195980) > accessed 31 March 2022, 27-28.

<sup>36</sup> 1980 Convention on Certain Conventional Weapons.

context.”<sup>37</sup> Crootof notes that Jensen<sup>38</sup> is in favour of proactive regulation from the point of view that “[r]ather than awaiting the reactive process of international humanitarian lawmaking, Jensen argues that we need to identify these tensions and attempt to correct them in advance”.<sup>39</sup> The proactive regulation of weapons in Outer Space, before their use could cause catastrophic damage and unnecessary suffering in this environment could be deemed to align with the principle of humanity. In addition to the recommendation being for binding law, it is for an independent legal instrument and while the ‘Space weapons’ currently in States’ military arsenals may not have the technological novelty to justify an independent regulatory instrument, the following recommendation highlights the element that this research argues to be novel and warrant such an approach.

**4. The approach to weapons regulation that the instrument would take should regulate based on the domain of weapons use as opposed to regulating based on the characteristics of the weapon.**

As noted, weapons need not be especially novel to function in Outer Space. Conventional weapons can function in Outer Space, as well as the specifically-designed ‘Space weapons’ that some States already possess. Thus, it would be difficult to regulate weapons on the basis of specific characteristics as they are all different. Even the ‘Space weapons’ discussed in this research include weapons that operate from Earth-to-Space, from Space-to-Space and the prospects of Space-to-Earth weapons; bearing in mind that only kinetic

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<sup>37</sup> Rebecca Crootof, ‘Regulating New Weapons Technology’ (June 14, 2018) in ‘The Impact of Emerging Technologies on the Law of Armed Conflict’ by Eric Talbot Jensen & Ronald T.P. Alcalá (eds) (Oxford University Press 2019 forthcoming) < [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3195980](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3195980) > accessed 31 March 2022, 28.

<sup>38</sup> Eric Talbot Jensen, ‘The Future of the Law of Armed Conflict: Ostriches, Butterflies, and Nanobots’ (2014) 35 Michigan Journal of International Law 253.

<sup>39</sup> Rebecca Crootof, ‘Regulating New Weapons Technology’ (June 14, 2018) in ‘The Impact of Emerging Technologies on the Law of Armed Conflict’ by Eric Talbot Jensen & Ronald T.P. Alcalá (eds) (Oxford University Press 2019 forthcoming) < [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3195980](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3195980) > accessed 31 March 2022, 28.

weapons were the focus of this research. Specifying the characteristics of the weapons to be regulated could also serve as a barrier to regulating future weapons prospects. Thus, the approach of regulating weapons used in the Outer Space domain, as opposed to focusing on their characteristics as weapons could provide the most practical approach to weapons regulation.

Following on from the previous recommendation, it could also be the environment in which they could be used which would serve as the justification for their inclusion in an entirely separate weapons regulation instrument as opposed to their being annexed in a protocol to the CCW.<sup>40</sup> It is noted by Major Wolff, while the alignment of Outer Space with other areas that are recognised as ‘common areas’ or part of the ‘global commons’ appears logical because of the similarities of the environments it is emphasised that the law applicable to Outer Space “is not maritime or air law “higher up.”<sup>41</sup> Rather, particularly with regards to the application of IHL and weapons regulation to Outer Space, Wolff highlights that “[p]hysically, space lacks borders and objects behave differently there. Accordingly, many legal principles will yield different results when applied in this domain.”<sup>42</sup> Weapons will operate and react differently in Outer Space. For example, the previously-discussed consequences that would be suffered as a result of weapons use triggering the Kessler Syndrome is entirely unique to Outer Space.<sup>43</sup> The application of IHL principles such as trying to calculate proportionality<sup>44</sup> in the use of a conventional weapons technology in Outer Space is increasingly difficult and yields less accurate predicted outcomes.

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<sup>40</sup> 1980 Convention on Certain Conventional Weapons.

<sup>41</sup> Major Joshua J Wolff, ‘Space Law: What It Is and Why It Matters’ (2020) 5 *Army Lawyer* 66, 67.

<sup>42</sup> *Ibid* 68.

<sup>43</sup> Bohumil Doboš and Jakub Pražák, ‘Master spoiler: a strategic value of Kessler Syndrome’ (2022) 22(1) *Defence Studies* 123.

<sup>44</sup> Major Joshua J Wolff, ‘Space Law: What It Is and Why It Matters’ (2020) 5 *Army Lawyer* 66, 68.

It has been seen in the past that IHL instruments which are specific to certain domains, such as armed conflict at sea, required separate instruments. In the instance on the 1949 Geneva Convention II,<sup>45</sup> Pictet, in his commentary, notes that at the Diplomatic Conference for the 1864 Geneva Convention, the proposal to include a provision extending the Convention to armed conflict at sea was rejected, which should be unsurprising at a time when “adequate information was lacking as to what naval warfare would be in the future”.<sup>46</sup> However, the gap left by the rejection of such a provision was evident at the Battle of Lissa in 1866 where Pictet describes that “the lack of organized medical aid or standards of protection had caused the needless death of many combatants”,<sup>47</sup> as the protections did not apply to the specifics of the domain of the sea. This battle started the meetings and negotiations that would eventually lead to the creation of Geneva Convention II.<sup>48</sup> Therefore, as was seen with the need for a specific instrument for armed conflict at sea, the specific physical nature of the environment of Outer Space itself and its unique variables require the regulation of weapons use in this environment to also be specific and dealt with separately to other weapons regulation instruments.

##### **5. A body should be assigned responsibility to oversee implementation of the recommended instrument.**

A body would require equal IHL and ISL expertise to oversee the implementation of the provisions of the recommended weapons regulation instrument. The ICRC is the guardian of the Geneva Conventions and UNCOPUOS is the key institution in dealing with ISL. However, the need for collaboration between the fields of IHL and ISL has been evident

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<sup>45</sup> 1949 Geneva Convention II.

<sup>46</sup> Jean S Pictet, ‘Commentary on Geneva Convention II for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea’ (ICRC, 1960) < [https://tile.loc.gov/storage-services/service/ll/lmlp/GC\\_1949-II/GC\\_1949-II.pdf](https://tile.loc.gov/storage-services/service/ll/lmlp/GC_1949-II/GC_1949-II.pdf) > accessed 28 September 2023, 4.

<sup>47</sup> Ibid.

<sup>48</sup> 1949 Geneva Convention II.

from the fact that attempts at weapons prohibition in Outer Space, through the draft PPWT,<sup>49</sup> were being proposed at the United Nations Committee on Disarmament, which is more of an IHL forum than an ISL forum. The Committee on Disarmament also already has an Open-Ended Working Group on Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviour, which was formed by General Assembly Resolution 76/231.<sup>50</sup> The knowledge-base of the Committee on Disarmament from this working group could form the basis for a supervisory body.

As the instrument being recommended is an IHL instrument, further clarification would be required as to whether breaches of the provisions with regards to weapons use in Outer Space would be considered as violations of the laws of war for the purpose of sanction. For example, universal jurisdiction involving “the assertion of criminal jurisdiction by a state in the absence of any other generally recognized head of prescriptive jurisdiction,”<sup>51</sup> applies to “breaches of the laws of war, and especially of the Hague Convention of 1907 and grave breaches of the Geneva Conventions of 1949.”<sup>52</sup> It is recommended that clarification as to whether violations of the recommended instrument would fall under universal jurisdiction be clarified alongside the establishment of a body overseeing implementation.

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<sup>49</sup> 2008 Draft PPWT and 2014 Draft PPWT.

<sup>50</sup> United Nations General Assembly Resolution 76/231 on Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviour (December 2021) A/RES/76/231.

<sup>51</sup> James Crawford, *Brownlie's Principles of Public International Law* (9<sup>th</sup> edn, Oxford University Press 2019) 451. See also Amina Adanan, ‘Allies and enemies, past and present: An analysis of the rationale for the development of universal jurisdiction over serious crimes under international law’ (PhD Thesis, National University of Ireland, Galway, 2017) 1-2: “allows a State without a nexus to an offence to prosecute an offence that occurs outside of its territory. The inhumanity of the act demands that the perpetrator be prosecuted, because he/she violates the common interests of the world community.”

<sup>52</sup> *Ibid* 452.

**6. The drafting of the regulatory instrument should incorporate multi-disciplinary knowledge, such as perspectives from the field of science and engineering.**

This diversity of knowledge is essential to inform the placement of limitations on the use of weapons in a unique environment such as that of Outer Space. Collaboration between the field of IHL and that of science in particular has occurred in the past. For example, in 2002, the ICRC made an appeal to scientists<sup>53</sup> due to their concern regarding scientific developments that could result in chemical and biological weapons. It was recognised that “[s]cientists have a special responsibility to advise governments objectively and to collaborate with others—lawyers, diplomats, and the military—to secure a world in which nobody risks being subject to poisoning and the deliberate spreading of disease.”<sup>54</sup> This multi-disciplinary knowledge, while essential to informing the provisions that would be drafted in a regulatory instrument, could also be integrated in weapons review processes, provided for in Article 36 of 1977 Additional Protocol I.<sup>55</sup>

**7. Private Space actors in armed conflict situations should be considered when drafting the instrument.**

As Chapter 1 noted, private actors are not subjects of international law. This general rule of international law is translated into the IHL and ISL frameworks. In relation to ISL, Von Der Dunk notes that “the traditional concept of state responsibility, which under general public international law applied only directly to acts of a state itself violating its international legal obligations towards another state, was widened in the space law

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<sup>53</sup> Robin Coupland and Kobi-Renée Leins, ‘Science and Prohibited Weapons’ (2005) 308(5730) *Science* 1841.

<sup>54</sup> *Ibid.*

<sup>55</sup> 1977 Additional Protocol I, art 36: “[i]n the study, development, acquisition or adoption of a new weapons, means or method of warfare, a High Contracting Party in under an obligation to determine whether its employment would, in some of all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party.”

context to include *all* space activities as long as qualifying as ‘*national* activities in outer space’.”<sup>56</sup> As more private actors become involved in Outer Space activities, the States have been taking on this responsibility. However, as this research focuses on weapons use and the recommendation of an IHL instrument, it is important that during the drafting of this instrument consideration is given to the prospect that private actors, that already possess Space-faring technology, could acquire ‘Space weapons’ technology.

In IHL, the question arises as to whether these private space actors would be considered as the equivalent to mercenaries in armed conflict situations? Private military corporations (PMCs) are “[s]ome of the newest armed non-state parties operating in unstable states and conflict situations”.<sup>57</sup> In the case of PMCs, the non-binding Montreux Document<sup>58</sup> was produced in 2008 to outline obligations that should be undertaken with regards to PMCs with the hope that as private actors, they would not be able to exist without limitation under international law. For example, it is recognised that the party to the armed conflict that hires a PMC is responsible for ensuring that the PMC complies with IHL obligations.<sup>59</sup> The status of PMC may only be allocated to private Space actors that are hired by States to conduct activity should an armed conflict break out in Outer Space. Additionally, consideration would need to be given to whether, if a private Space actor, was not hired by a State but engaged in the armed conflict of their own accord; would they be considered a non-state armed group (NSAG)? If this were the case, would the State remain responsible for this new NSAG as per ISL. These are all considerations

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<sup>56</sup> Frans von der Dunk, ‘International space law’ in Frans von der Dunk and Fabio Tronchetti (eds), *Handbook of Space Law* (Edward Elgar Publishing 2015) 46.

<sup>57</sup> Lindsey Cameron, ‘Private military companies: their status under international humanitarian law and its impact on their regulation’ (2006) 88(863) *International Review of the Red Cross* 573.

<sup>58</sup> The Montreux Document on pertinent international legal obligations and good practices for States related to operations of private military and security companies during armed conflict (17 September 2008).

<sup>59</sup> *Ibid* Part I (A)(3): “Contracting States have an obligation, within their power, to ensure respect for international humanitarian law by PMSCs they contract”.

that must be clarified with respect to private Space actors, especially as their role in Outer Space increases.

These considerations would also be important because, despite this apparent legal vacuum in which private actors exist in international law, there have been examples of executives of private corporations being held responsible for being associated with the commission of war crimes. For example, the on-going case of *Prosecutor v. Ian Lundin and Alex Schneider*<sup>60</sup> was taken by Sweden under universal jurisdiction against the Lundin Energy oil company for being complicit with war crimes committed in South Sudan between 1999-2003. This illustrates that private actors are being held responsible for their activities during armed conflict under international law. This case could signal the beginning of a trend, which the recommended regulatory instrument should establish its stance on, alongside its stance on private Space actors in armed conflict in Outer Space, during the drafting process.

#### **7.4 Direction of Future Research**

This research focused on investigating and forming recommendations to address the gap that exists with respect to weapons use in Outer Space at the intersection of the ISL and IHL frameworks. The topics of weapons use and overall military uses of Outer Space have garnered attention, as highlighted by the formation of and the work carried out by the Open-Ended Working Group on Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviour<sup>61</sup> within the UN Committee on Disarmament. Nevertheless, further research on the topic is required. For example, a further research topic identified is an investigation of non-kinetic weapons, such as directed-energy

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<sup>60</sup> *Prosecutor v. Ian Lundin and Alex Schneider* (on-going 2023) (Sweden).

<sup>61</sup> United Nations General Assembly Resolution 76/231 on Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviour (December 2021) A/RES/76/231.

weapons and the risks that they pose to security in Outer Space. The consequences of their use do not necessarily pose the immediate risks of unnecessary suffering and superfluous injury as kinetic weapons such as ASAT weapons. However, their use also remains unregulated in the ISL framework and they are a weapons technology that is gathering increased attention because, as is outlined by Lockheed Martin, these weapons offer “affordable, effective defense at the speed of light”.<sup>62</sup> In addition, as discussed in Chapter 6, the plans for Outer Space activities which introduce more humans into Outer Space would require clarification as to the categorisation of civilians and combatants in Outer Space<sup>63</sup> upon which further research would be important and a relevant contribution to the field. Thus, as the militarisation of Outer Space continues to escalate, it is intended that future research topics will remain at the intersection of IHL and ISL.

The author’s previous publications have also focused on other issues in relation to Outer Space activities, such as satellite mega-constellation interrupting the view of the night sky and the impact this has on the cosmologies and practices of Indigenous peoples.<sup>64</sup> Thus, it is likely that timely space law issues alongside IHL research will constitute the direction of future research following on from this thesis. For example, a pertinent issue in Outer Space that warrants further research is that of cultural heritage in Outer Space,<sup>65</sup>

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<sup>62</sup> Lockheed Martin, ‘Next-Gen Threats Require Next-Gen Defenses’ < accessed 6<sup>th</sup> September 2023.

<sup>63</sup> Nina-Louise Remuss, ‘Astronauts: from envoys of mankind to combatants’ in Ulrike Landfester, Nina-Louise Remuss, Kai-Uwe Schrogl & Jean-Claude Worms (eds) *Humans in Outer Space – Interdisciplinary Perspectives* (Springer Vienna 2011).

<sup>64</sup> Ciara Finnegan, ‘Indigenous Interests in Outer Space: Addressing the Conflict of Increasing Satellite Numbers with Indigenous Astronomy Practices’ (2022) 11(26) *Laws*.

<sup>65</sup> See Alice Gorman, ‘Space Debris, Space Situational Awareness and Cultural Heritage Management in Earth Orbit’ in Melissa de Zwart and Stacey Henderson (eds), *Commercial and Military Uses of Outer Space* (Springer 2021) 134: “[t]he heritage of space exploration is embedded in landscapes on Earth, where the terrestrial infrastructure related to the development, launch, tracking and return of spacecraft is located. Off-Earth, we find satellites, spacecraft, and space junk in Earth orbit; landing sites on planets, moons, asteroids, and comets; and spacecraft and probes ranging from close to the Sun to interstellar space”. See also P.J. Capelotti, *The human archaeology of space. Lunar, planetary and interstellar relics of exploration* (McFarland and Company 2010).

particularly that on the Moon which could be at risk as the Artemis and State missions to return to the Moon progress.

## **7.5 Final Observations**

This research has analysed weapons regulation through the lens of the principle of humanity. The central research question of this thesis asked how this principle could be utilised to form recommendations for the regulation of the use of weapons in Outer Space. This research has answered this question by illustrating that using the principle of humanity as a lens investigating the IHL and ISL frameworks grounds the research in considering weapons use in Outer Space in relation to the unnecessary suffering and superfluous injury that could be caused to humankind as a whole. From this analysis, recommendations for a regulatory instrument are formed that focus on addressing the gap in the existing regime identified in answering research sub-question 2, with the knowledge of the regime outlined in answering research sub-question 1. The lens of the principle of humanity, which has a central role in weapons regulation that was highlighted in answering research sub-question 3, can be used to form recommendations to address the gap in the existing frameworks with regard to weapons regulation by rooting this analysis and recommendations at the foundation of IHL that is concerned with reducing the suffering of humans (in this instance, humankind) in armed conflict situations.

In the tense, crowded and increasingly-competitive environment of Outer Space, weaponisation in the sense of placing weapons in orbit is growing nearer. As the already-witnessed use of weapons from Earth to Space has illustrated, the unregulated use of kinetic Space weapons poses significant risk to humankind as a whole; and these are not the only weapons that can be used in the Outer Space domain. While Chapter 1 outlined the current context of Outer Space activities, which has evolved since humankind's first

interactions with Outer Space; the regulation of weapons use in the ISL framework has not experienced the same evolution. The recommendations outlined in this Chapter, based on the analysis of this research, address the gap in the ISL and IHL framework's by utilising the principle of humanity that is central to IHL. As Outer Space is receiving increased international attention, the consequences of actions carried out in this domain, specifically those impacting humankind, should be a priority – including the regulation of weapons use.

## **Bibliography**

### **Legal Instruments**

#### **Domestic Legal Instruments**

‘National Aeronautics and Space Act of 1958’ Public Law #85-568, 72 Stat 426 Signed by the President on July 29 1958 (United States).

Federal Ministry of Defence of the Federal Republic of Germany, ‘Humanitarian Law in Armed Conflict – Manual’ (1992) VR II (Germany).

Israel Military Advocate-General’s Corps Command, ‘Rules of Warfare on the Battlefield’ (IDF School of Military Law 2<sup>nd</sup> edn 2006) (Israel).

*Law of July 20<sup>th</sup>, 2017, on the Exploration and Use of Space Resources* (Luxembourg).

*Space (Launches and Returns) Act 2018* (Australia).

*Space Operations Act (LOI n° 2008518 du 3 juin 2008 relative aux opérations spatiales)* (France).

### **European Law**

#### **European Union Law**

European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Space Strategy for Europe [26 October 2016 Brussels] COM (2016) 705 final.

European Union, ‘Consolidated version of the Treaty on the Functioning of the European Union’ [26 October 2012] OJ L. 326/47-326/390.

Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme and repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU [2021] OJ L170/69.

### **European Space Agency Documents**

Conference of Plenipotentiaries, ‘Convention for the establishment of a European Space Agency’ (opened for signature 30 May 1975, entered into force 30 October 1980) CSE/CS (73)19.

European Space Agency, ‘Regulations of the European Space Agency: Industrial Policy Rules and Regulations’ (1 July 2015) ESA/REG/009.

European Space Agency, ‘Regulations of the European Space Agency: Rules on Information, Data and Intellectual Property’ (23 April 2014) ESA/REG/008.

European Space Agency, ‘Regulations of the European Space Agency: Security Regulations’ (1 July 2020) ESA/REG/004.

European Space Agency, ‘Regulations of the European Space Agency: General Clauses and Conditions for ESA Contracts’ (5 July 2019) ESA/REG/002.

European Space Agency, *ESA Convention and Council Rules of Procedure* (8<sup>th</sup> edn, ESA Communications 2019).

## **International Treaties**

Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (concluded 5 December 1979, entered into force 11 July 1984) UNTS vol. 1363, p. 3 (1979 Moon Agreement)

Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (opened for signature 22 April 1968, adopted 3 December 1968) UNGA Resolution 2345 (XXII) (1968 Rescue Agreement).

Charter of the United Nations (signed 26 June 1945, adopted 24 October 1945) 1 UNTS XVI (1945 Charter of the United Nations).

Constitution and Convention of the International Telecommunications Union (concluded 22 December 1992, entered into force 1 July 1994) UNTS 1825, 1826 (1992 Constitution and Convention of the ITU).

Convention (II) with Respect to the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land (signed 29 July 1899, entered into force 4 September 1900) (1899 Hague Convention II).

Convention for the Amelioration of the Condition of the Wounded and Sick in Armies in the Field (adopted 6 July 1906, entered into force 9 August 1907) (1906 Geneva Convention).

Convention for the Amelioration of the Condition of the Wounded in Armies in the Field. Geneva, 22 August 1864 (adopted 22 August 1864, entered into force 22 June 1865) 75 UNTS 31 (1864 Geneva Convention).

Convention on Cluster Munitions (adopted 30 May 2008, entered into force 1 August 2010) 2688 UNTS 39 (2008 Convention on Cluster Munitions).

Convention on International Liability for Damage Caused by Space Objects (concluded 29 March 1972, entered into force 1 September 1972) UNTS vol. 961, p. 187 (1972 Liability Convention).

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 (adopted 10 October 1980, entered into force 2 December 1983) 1342 UNTS 137 (1980 Convention on Certain Conventional Weapons).

Convention on Registration of Objects Launched into Outer Space (concluded 12 November 1974, entered into force 15 September 1976) UNTS vol. 1023, p. 15 (1974 Registration Convention).

Convention on the prohibition of military or any hostile use of environmental modification techniques (adopted 10 December 1976, entered into force 5 October 1978) UN, A/Res./31/72 (1976 ENMOD Convention).

Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (adopted 10 April 1972, entered into force 26 March 1975) UNTS Vol 1015 (1972 Biological Weapons Convention).

Convention on the prohibition of the development, production, stockpiling and use of chemical weapons and on their destruction (adopted 13 January 1993, entered into force 29 April 1997) Doc. CD/CW/WP.400/Rev. 1 (1993 Chemical Weapons Convention).

Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction (adopted 18 September 1997, entered into force 1 March 1999) 2056 UNTS 211 (1997 Anti-Personnel Mine Ban Convention).

Convention relating to the regulation of Aerial Navigation (with additional Protocol), signed at Paris, October 13, 1919 (adopted 13 October 1919, entered into force 29 March 2022) LNTS 11, p173 (1919 Paris Convention).

Convention relative to the Treatment of Prisoners of War (adopted 27 July 1929, not in force) (1929 Geneva Convention).

Declaration (IV,3) concerning Expanding Bullets (adopted 29 July 1899, entered into force 4 September 1900) (1899 Hague Declaration (IV, 3)).

Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight. Saint Petersburg (adopted 29 November 1868, entered into force 11 December 1868) (1868 St. Petersburg Declaration).

General Orders No 100: Instructions for the Government of Armies of the United States in the Field (adopted 24 April 1863) (1863 Lieber Code).

Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field (signed 12 August 1949, entered into force 21 October 1950) 75 UNTS 31 (1949 Geneva Convention I).

Geneva Convention for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea (signed 12 August 1949, entered into force 21 October 1950) 75 UNTS 85 (1949 Geneva Convention II).

Geneva Convention Relative to the Protection of Civilian Persons in Time of War (signed 12 August 1949, entered into force 21 October 1950) 75 UNTS 287 (1949 Geneva Convention IV).

Geneva Convention Relative to the Treatment of Prisoners of War (signed 12 August 1949, entered into force 21 October 1950) 75 UNTS 135 (1949 Geneva Convention III).

Hague Convention (IV) Respecting the Laws and Customs of War on Land and Its Annex: Regulations Concerning the Laws and Customs of War on Land (signed 18 October 1907, entered into force 26 January 1910) (1907 Hague Convention).

Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (adopted 8 June 1977, entered into force 7 December 1978) 1125 UNTS 3 (1977 Additional Protocol I).

Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of Non-International Armed Conflicts (adopted 8 June 1977, entered into force 7 December 1978) 1125 UNTS 609 (1977 Additional Protocol II).

Protocol Concerning Nondetectable Fragments, 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 (adopted 10 October 1980, entered into force 2 December 1983) 1342 UNTS 137 (1980 Protocol I to the 1980 Convention on Certain Conventional Weapons).

Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (entered into force 8<sup>th</sup> February 1928) (1925 Geneva Gas Protocol).

Protocol on Blinding Laser Weapons, 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 (adopted 13 October 1995, entered into force 30 July 1998) 1380 UNTS 370 (1995 Protocol IV to the 1980 Convention on Certain Conventional Weapons).

Protocol on Explosive Remnants of War, 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 (adopted 28 November 2003, entered into force 12 November 2006) 2399 UNTS 100 (2003 Protocol V to the 1980 Convention on Certain Conventional Weapons).

Protocol on Prohibitions or Restrictions on the Use of Incendiary Weapons, 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 (adopted 10 October 1980, entered into force 2 December 1983) 1342 UNTS 137 (1980 Protocol III to the 1980 Convention on Certain Conventional Weapons).

Protocol on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices, 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 (adopted 10 October 1980, entered into force 2 December 1983) 1342 UNTS 137 (1980 Protocol II to the 1980 Convention on Certain Conventional Weapons).

Rome Statute of the International Criminal Court (adopted 17 July 1998, last amended 2010) ISBN No. 92-9227-227-6 (1998 Rome Statute of the International Criminal Court).

See The Antarctic Treaty (signed 1 December 1959, entered into force 23 June 1961) 402 UNTS 71 (1959 Antarctic Treaty).

Statute of the Court of International Justice (published 18 April 1946) (1946 ICJ Statute).

Treaty Banning Nuclear Weapon Tests in the Atmosphere in Outer Space and Under Water (concluded 5 September 1963, entered into force 10 October 1963) UNTS vol. 480 (1963 Limited Test Ban Treaty).

Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems (concluded 26 May 1972, entered into force 3 October 1972) UNTS vol. 944, p. 13 (1972 Anti-Ballistic Missile Treaty).

Treaty on the Non-Proliferation of Nuclear Weapons (opened for signature 1968, entered into force 1970) UNTS 729, p.161 (1968 Non-Proliferation Treaty).

Treaty on the Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (adopted 27 January 1967, entered into force 10 October 1967) 610 UNTS 205 (1967 Outer Space Treaty).

Treaty on the Prohibition of Nuclear Weapons (adopted 7 July 2017, entered into force 22 January 2021) UNTS Vol 3379CN.475.2017 (2017 Treaty on the Prohibition of Nuclear Weapons).

UN Security Council, Statute of the International Criminal Tribunal for the Former Yugoslavia (signed 25 May 1993, amended 17 May 2002) (1993 Statute of the International Criminal Tribunal for the Former Yugoslavia)

UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (adopted 16 November 1972, entered into force 17 December 1975) (1972 UNESCO Convention).

United Nations Convention on the Law of the Sea (published 10 December 1982, entered into force 16 November 1994) (1982 UN Convention on the Law of the Sea).

### **Soft Law Instruments**

Institute of International Law, 'Project of an International Declaration concerning the Laws and Customs of War. Brussels' (27 August 1874).

The Montreux Document on pertinent international legal obligations and good practices for States related to operations of private military and security companies during armed conflict (17 September 2008).

## **Soft-Law Expert Manuals**

Dinstein, Yoram and Willy Dahl, Arne, *Oslo Manual on Select Topics of the Law of Armed Conflict – Rules and Commentary* (Springer Open 2020) (2020 Oslo Manual).

Institute of International Law ‘The Laws of War on Land. Oxford’ (adopted 9 September 1880) (1880 Oxford Manual of the Laws of War and Land).

International Group of Experts at the Invitation of the NATO Cooperative Cyber Defence Centre of Excellence, *Tallinn Manual on the International Law Applicable to Cyber Warfare* (Cambridge University Press 2013) (Tallinn Manual).

International Group of Experts at the Invitation of the NATO Cooperative Cyber Defence Centre of Excellence, *Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations* (Cambridge University Press 2017) (Tallinn Manual 2.0).

International Institute of Humanitarian Law, ‘San Remo Manual on International Law Applicable to Armed Conflicts at Sea’ (adopted 12 June 1994) (1994 San Remo Manual).

Jaku, Ram S and Freeland, Steven (eds), *McGill Manual on International Law Applicable to Military Uses of Outer Space: Volume I – Rules* (McGill 2022) (2022 McGill Manual).

The Program on Humanitarian Policy and Conflict Research at Harvard University, *Harvard Humanitarian Policy and Conflict Research (HPCR) Manual on International Law Applicable to Air and Missile Warfare* (Cambridge University Press 2013) (2013 HPCR Manual).

## **United Nations Security Council Resolutions**

United Nations Security Council Resolution 1325, ‘Resolution on Women and Peace and Security’ (October 2000) S/RES/1325.

United Nations Security Council Resolution 1718, 'Establishment of a Security Council Sanctions Committee (1718 Committee)' (14 October 2006) S/RES/1718.

### **United Nations General Assembly Resolutions**

United Nations General Assembly Document 6695, 'Note verbale dated 17 August 1967 from the Permanent Mission of Malta to the United Nations addressed to the Secretary-General' (18 August 1967) U.N. Doc A/6695.

United Nations General Assembly Resolution 110, 'Resolution 110(II): Measures to be taken against propaganda and the inciters of a new war' (3 November 1947) A/RES/2/110.

United Nations General Assembly Resolution 1148, 'Regulation, limitation and balanced reduction of all armed forces and all armaments; conclusion of an international convention (treaty) on the reduction of armaments and the prohibition of atomic, hydrogen and other weapons of Mass destruction' (14 November 1957) A/RES/1148(XII).

United Nations General Assembly Resolution 1348, 'Questions on the Peaceful Uses of Outer Space' (13 December 1958) A/RES/1348 (XIII).

United Nations General Assembly Resolution 1472, 'International co-operation in the peaceful uses of outer space' (12 December 1959) RES 1472 (XIV).

United Nations General Assembly Resolution 1884, 'Question of General and Complete Disarmament' (17 October 1963) UNGA 5 A/RES/1884 (XVIII).

United Nations General Assembly Resolution 1962, 'Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space' (13 December 1963) RES 1962 (XVIII) (1963 Declaration of Legal Principles).

United Nations General Assembly Resolution 37/92, 'Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting' (10 December 1982) A/RES/37/92 (1982 Broadcasting Principles).

United Nations General Assembly Resolution 41/63, 'Principles Relating to Remote Sensing of the Earth from Outer Space' (3 December 1986) RES 41/63 (1986 Remote Sensing Principles).

United Nations General Assembly Resolution 43/70, 'Prevention of an Arms Race in Outer Space' (7 December 1988) RES 43/70.

United Nations General Assembly Resolution 47/68, 'Principles Relevant to the Use of Nuclear Power Sources in Outer Space' (14 December 1992) RES 47/68 (1992 Nuclear Power Sources Principles).

United Nations General Assembly Resolution 51/122, 'Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries' (1996) RES 51/122.

United Nations General Assembly Resolution 68/74, 'Recommendations on national legislation relevant to the peaceful exploration and use of outer space' (11 December 2013) A/RES/68/74.

United Nations General Assembly Resolution 69/32, 'No first placement of weapons in outer space' (2 December 2014) A/RES/69/32.

United Nations General Assembly Resolution 70/27, 'No first placement of weapons in Outer Space' (11 December 2015) UNGA A/RES/70/27.

United Nations General Assembly Resolution 76/231, 'Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviour' (December 2021) A/RES/76/231.

### **UN COPUOS Documents**

U.N. COPUOS Legal Sub-Committee, 'Status of International Agreements relating to activities in outer space as at 1 January 2023' (20 March 2023) A/AC.105/C.2/2023/CRP.3.

U.N. COPUOS, 'Draft agreement on the rescue of astronauts, the return of astronauts and the return of objects launched into outer space' (1967) A/AC.105/C.2/L.28/Rev.1.

U.N. COPUOS, 'Statement by US Ambassador Goldberg' (1966) Legal Subcommittee, 5th Session, U.N. Doc. A/AC.IOS/CJ/ SR.62.

U.N. COPUOS, 'Statement of Argentinian Ambassador Aldo Cocca' (19 June 1967) Legal Sub-Committee, 6<sup>th</sup> Session U.N. Doc. A/AC. 105/C. 2/SR. 75.

U.N. COPUOS, Summary Record on the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Space (1963) Legal Sub-Committee A/AC.105/C.2/SR.16.

U.N. COPUOS, United Arab Republic: Proposal, Working Paper No 8 (22 July 1966) Legal Sub Committee, 5<sup>th</sup> Session, A/AC.105/35.

UN COPUOS Legal Sub-Committee, 'Status of International Agreements relating to activities in outer space as at 1 January 2023' (20-31 March 2023) A/AC.105/C.2/2023/CRP.3.

UN COPUOS, First Committee Verbatim Records on the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space (1963) A/C.1/PV.1342.

### **Proposals to United Nations Conference on Disarmament**

Conference on Disarmament, 'Letter Dated 12 February 2008 from the Permanent Representative of the Russian Federation and the Permanent Representative of China to the Conference of Disarmament addressed to the Secretary-General of the Conference transmitting the Russian and Chinese Texts of the Draft 'Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Other Space Objects (PPWT)' by the Russian Federation and China' (29 February 2008) CD/1839 (2008 Draft PPWT).

Conference on Disarmament, 'Letter Dated 10 June 2014 from the Permanent Representative of the Russian Federation and the Permanent Representative of China to the Conference of Disarmament addressed to the Secretary-General of the Conference transmitting the updated Russian and Chinese Texts the Draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Other Space Objects (PPWT) by the Russian Federation and China' (10 June 2014) CD/1985 (2014 Draft PPWT).

### **Cooperative Agreements**

NASA, 'The Artemis Accords Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes' (13 October 2020).

Agreement among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, The Government of the Russian Federation, and the Government of the United States of America concerning Cooperation on the Civil International Space Station (29 January 1998).

## **Case Law**

### **Domestic Case Law**

*Prosecutor v. Ian Lundin and Alex Schneider* (on-going 2023) (Sweden).

*Ryuchi Shimoda et al v the State* [1963] Tokyo District Court (Japan).

### **International Military Tribunal Case**

*The Trial of German Major War Criminals: Proceedings of the International Military Tribunal sitting at Nuremberg, Germany* Part XXII. (22 August 1946 to 31 August 1946, 30 September 1946 and 1 October 1946).

### **International Criminal Tribunal for the former-Yugoslavia Cases**

*Prosecutor v Anto Furundžija* (Trial Judgment) ICTY IT-95-17/1-T (10 December 1998).

*Prosecutor v Kupreškić et al* (Trial Judgment) ICTY IT-95-16-T (14 January 2000).

*Prosecutor v Milan Martić* (Judgment) ICTY IT-95-11-T (12 June 2007).

*Tadić Case* (Judgment) ICTY-94-1 (26 January 2000).

### **International Criminal Tribunal for Rwanda Case**

*Prosecutor v Akayesu* (Judgment) ICTR-96-4-T, T Ch I (2 September 1998).

### **Permanent Court of International Justice Case**

*Case of the SS Lotus (France v Turkey)* (1927) P.C.I.J. (ser. A) No. 10 (Sept. 7).

### **International Court of Justice Cases**

*Case Concerning Military and Paramilitary Activities In and Against Nicaragua (Nicaragua v. United States of America)* (Merits) [1986] ICJ Reports 14.

*Corfu Channel Case (United Kingdom v Albania)* (Merits) [1949] ICJ Rep 4.

*Fisheries (UK v Norway)* (Merits) [1951] ICJ Rep 116.

*Interhandel (Switzerland v United States of America) Case* (Judgment) [1959] ICJ Rep. 6, at 114.

*Interhandel (Switzerland v United States of America) Case* (Judgment) [1959] ICJ Rep. 6, at 104, Sir Hersch Lauterpacht's Dissenting Opinion.

*Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Reports 1996, para 78.

*North Sea Continental Shelf Cases (Federal Republic of Germany v. Denmark; Federal Republic of Germany v. Netherlands)* [1969] ICJ Reports p.3.

*Norwegian Loans case (France v Norway)* (Judgment) [1957] ICJ Rep. at 48, Separate Opinion of Judge Lauterpacht to the Decision of 6 July 1957.

## **Books**

Aberth, John, *An Environmental History of the Middle Ages: The Crucible of Nature* (Taylor & Francis Publishing 2012).

Aristotle (translated by H. Rackham) *Politics* (Harvard University Press 1932).

Aristotle (translated by H. Rackham) *Politics* (Harvard University Press 1932).

Bahrani, Zainab, *Rituals of War: The body and violence in Mesopotamia* (Zone Books 2008).

Baldwin, Robert, Cave, Martin and Lodge, Martin, *Understanding Regulation: Theory, Strategy, and Practice* (Oxford University Press 2012).

Best, Geoffrey, *Humanity in Warfare: The Modern History of the International Law of Armed Conflicts* (Methuen & Co Ltd 1983).

Bruna, Claudio, and Accettura, Antonio G., (eds), *Advanced Propulsion Systems and Technologies, Today to 2020* (American Institute of Aeronautics and Astronautics 2000).

Bryden, Alan, *International Law, Politics and Inhuman Weapons: The Effectiveness of Global Landmine Regimes* (Taylor & Francis Group 2012).

Burgess, Colin, *The Greatest Adventure: A History of Human Space Exploration* (Reaktion Books 2021).

Byres, Michael and Boley, Aaron, *Who Owns Outer Space? International Law, Astrophysics, and the Sustainable Development of Outer Space* (Cambridge University Press 2023).

Capelotti, P.J., *The human archaeology of space. Lunar, planetary and interstellar relics of exploration* (McFarland and Company 2010).

Chadwick Oman, Charles William, *The Art of War in the Middle Ages: A.D. 378 – 1515* (Cornell University Press 1953).

Crawford, Emily and Pert, Alison, *International Humanitarian Law* (2<sup>nd</sup> edn, Cambridge University Press 2020).

Crawford, Emily, *Non-Binding Norms in International Humanitarian Law: Efficacy, Legitimacy, and Legality* (Oxford University Press 2021).

Crawford, James, *Brownlie's Principles of Public International Law* (9<sup>th</sup> edn, Oxford University Press 2019).

D'Aspremont, Jean, *Formalism and the Sources of International Law: A Theory of the Ascertainment of Legal Rules* (Oxford University Press 2011).

Dinstein, Yoram, *The Conduct of Hostilities under the Law of International Armed Conflict* (2<sup>nd</sup> edn, Cambridge University Press 2010).

Dunant, Henry, *A Memory of Solferino* (American Red Cross 1939).

Gillespie, Alexander, *History of the Laws of War: Volume 2: The Customs and Laws of War with regards to Arms Control* (Hart Publishing 2011).

Glover, Jonathan, *Humanity: A Moral History of the Twentieth Century* (Pimlico 2001).

Hobbes, Thomas and Tonnies, Ferdinand (eds), *Elements of Law, Natural and Politic* (Cambridge University Press 1928).

Houlihan, James W, *Adomnán's Lex Innocentium and the Laws of War* (Four Courts Press 2020).

Johns, C.H.W. (translator), *The Oldest Code of Laws in the World: The Code of Law Promulgated by Hammurabi, King of Babylon B.C. 2285-2242* (T&T Clark 1903).

Kelly, Fergus, *A Guide to Early Irish Law* (Dundalgan Press Ltd 2005).

Kenny, Anthony, *The Logic of Deterrence* (Firethorn Press 1985).

Kolb, Robert, *Advanced Introduction to International Humanitarian Law* (Edward Elgar Publishing Limited 2014).

Kramer, Samuel Noah, *The Sumerians: Their History, Culture and Character* (The University of Chicago Press 1963).

Larsen, Jeffrey A., *Arms Control: Cooperative Security in a Changing Environment* (Lynne Rienner Publishers 2002).

Larsen, Kjetil Muiezinovic, Cooper, Camilla Guldahl and Nystuen, Gro, *Searching for a 'Principle of Humanity' in International Humanitarian Law* (Cambridge University Press 2012).

Locke, John and Shapiro, Ian (eds), *Two Treatises of Government and a Letter Concerning Toleration* (Yale University Press 2003).

Lupton, David E, *On Space Warfare: A Space Power Doctrine* (Air University Press 1998).

Lyall, Francis and Larsen, Paul B, *Space Law: A Treatise* (2<sup>nd</sup> edn, Routledge 2018).

- Márkus, Gilbert, *Adomnán's 'Law of the Innocents': a seventh century law for the protection of non-combatants* (Blackfriars Books 1997).
- Melzer, Nils, *International Humanitarian Law: A Comprehensive Introduction* (ICRC 2019).
- Meron, Theodor, *Bloody Constraint: War and Chivalry in Shakespeare* (Oxford University Press 1998).
- Mitchell, Stephen, *A History of the Later Roman Empire, AD 284 – 641* (John Wiley & Sons 2014).
- Moltz, James Clay, *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests* (3<sup>rd</sup> edn, Stanford University Press 2019).
- Morgan, Bronwen, Yeung, Karen and Twining, William, *An Introduction to Law and Regulation: Text and Materials* (Cambridge University Press 2007).
- Mutschler, Max M, *Arms Control in Space* (Palgrave MacMillan 2013).
- Paladini, Stefania, *The New Frontiers of Space: Economic Implications, Security Issues and Evolving Scenarios* (Palgrave Macmillan 2019).
- Pellegrino, Massimo and Stang, Gerald, *Space Security for Europe* (Institute for Security Studies 2016).
- Phillipson, Coleman, *The International Law and Custom of Ancient Greece and Rome* (Macmillan & Co 1911).
- Pictet, Jean S. et al (ed), *The Geneva Conventions of 12 August 1949. I: Geneva Convention I for the amelioration of the condition of the wounded and sick in armed forces in the field: Commentary* (ICRC 1952).

Pictet, Jean, *Development and Principles of International Humanitarian Law* (Martinus Nijhoff Publishers 1985).

Preston, Robert, et al., *Space Weapons, Earth Wars* (The RAND Corporation 2002).

Russell, Frederick H., *The Just War in The Middle Ages* (Cambridge University Press 1975).

Sadeh, Eligar, *The Politics of Space: A Survey* (Taylor & Francis Group 2010).

Sassòli, Marco, and Nagler, Patrick S, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar Publishing 2019).

Sassòli, Marco, Bouvier, Antoine A and Quintin, Anne, *How Does Law Protect in War? Cases, Documents and Teaching Materials on Contemporary Practice in International Humanitarian Law Volume I* (3<sup>rd</sup> edn, ICRC 2011).

Schelling, Thomas C. and Halperin, Morton H., *Strategy and Arms Control* (Twentieth Century Fund 1961).

Solis, Gary D, *The Law of Armed Conflict: International Humanitarian Law in War* (Cambridge University Press 2010).

Tsagourias, Nicholas and Morrison, Alasdair, *International Humanitarian Law: Cases, Materials and Commentary* (Cambridge University Press 2018).

Tzu, Sun (edited, translated & with an introduction by John Minford), *The Art of War: The essential translation of the classic book of life* (Penguin Books 2003).

Tzu, Sun (translated by Lionel Giles), *The Art of War* (Dover Publications Inc. 2002).

Wolff, Jonathan, *An Introduction to Political Philosophy* (3<sup>rd</sup> edn, Oxford University Press 2016).

### **Chapters in Edited Books**

Blake, Duncan, 'Military Strategic Use of Outer Space' in Hitoshi Nasu and Robert McLaughlin (eds), *New Technologies and the Law of Armed Conflict* (Asser Press 2014).

Boothby, William H., 'Regulating New Weapons Technologies' in William H. Boothby (ed) *New Technologies and the Law in War and Peace* (Cambridge University Press 2019).

Boothby, William H., 'The Legal Challenges of New Technologies: An Overview' in Hitoshi Nasu and Robert McLaughlin (eds) *New Technologies and the Law of Armed Conflict* (Asser Press 2014).

Boyle, Alan, 'Soft Law in International Law-Making' in Malcolm D. Evans (ed) *International Law* (5<sup>th</sup> edn, Oxford University Press 2018).

Craven, Matthew and Parfitt, Rose, 'Statehood, Self-Determination, and Recognition' in Malcolm D. Evans (ed), *International Law* (5<sup>th</sup> edn, Oxford University Press 2018).

De Zwart, Melissa, 'Outer Space' in William H. Boothby (ed) *New Technologies and the Law in War and Peace* (Cambridge University Press 2019).

De Zwart, Melissa, 'To the Moon and Beyond: The Artemis Accords and the Evolution of Space Law' in Melissa de Zwart and Stacey Henderson (eds) *Commercial and Military Uses of Outer Space* (Springer 2021).

De Zwart, Melissa, Henderson, Stacey and Neef, Rachel, 'Legal and Ethical Planetary Protection Frameworks for Crewed Missions' in Melissa de Zwart, Stacey Henderson,

John Culton, Deborah Turnbull and Amit Srivastava (eds), *Human Uses of Outer Space: Return to the Moon* (Springer 2023).

Dinstein, Yoram, 'Law of Armed Conflict Manuals' in Terry D. Gill et al (eds) *Yearbook of International Humanitarian Law 2020* (Vol 23, Asser Press 2022).

Freeland, Steven, 'The Laws of War in Outer Space' in Kai Uwe Schrogl et al (eds) *Handbook of Space Security* (Springer 2015).

Gallegos, Frank, 'After the Gulf War: Balancing Space Power's Development' in Bruce M DeBlois (ed), *Beyond the Paths of Heaven: The Emergence of Space Power Thought* (Air University Press Maxwell Air Force Base 1999).

Gorman, Alice, 'Space Debris, Space Situational Awareness and Cultural Heritage Management in Earth Orbit' in Melissa de Zwart and Stacey Henderson (eds), *Commercial and Military Uses of Outer Space* (Springer 2021).

Grego, Laura, 'The Case for Space Arms Control' in Melissa de Zwart and Stacey Henderson (eds), *Commercial and Military Uses of Outer Space* (Springer 2021).

Henderson, Stacey and De Zwart, Melissa, 'Returning Humans to the Moon' in Melissa de Zwart, Stacey Henderson, John Culton, Deborah Turnbull and Amit Srivastava (eds), *Human Uses of Outer Space: Return to the Moon* (Springer 2023).

Jankowitsch, Peter, 'The Background and History of Space Law' in Frans von der Dunk and Fabio Tronchetti (eds) *Handbook of Space Law* (Edward Elgar Publishing 2015).

Kennedy, Rónán, 'Doctrinal Analysis: The Real 'Law in Action'' in Laura Cahillane and Jennifer Schweppe (eds), *Legal Research Methods: Principles and Practicalities* (Clarus Press 2016).

Kleffner, Jann K, 'Scope of Application of International Humanitarian Law' in Dieter Fleck (ed) *The Handbook of International Humanitarian Law* (3<sup>rd</sup> edn, Oxford University Press 2013).

Murphy, Colleen, 'Minimum Moral Threshold At War's End' in Graham Parsons and Mark Wilson (eds), *How to End a War: Essays on Justice, Peace and Repair* (Cambridge University Press 2023).

Neff, Stephen C, 'A Short History of International Law' in Malcolm D. Evans (ed), *International Law* (5<sup>th</sup> edn, Oxford University Press 2018).

Pardo, Arvid, 'Law of the Sea Conference – What Went Wrong' in Robert L Friedheim (ed), *Managing Ocean Resources: A Primer* (Routledge Taylor & Francis Group 1979).

Remuss, Nina-Louise 'Astronauts: from envoys of mankind to combatants' in Ulrike Landfester, Nina-Louise Remuss, Kai-Uwe Schrogl & Jean-Claude Worms (eds) *Humans in Outer Space – Interdisciplinary Perspectives* (Springer Vienna 2011).

Roberts, Anthea and Sivakumaran, Sandesh, 'The Theory and Reality of the Sources of International Law' in Malcolm D. Evans (ed) *International Law* (5<sup>th</sup> edn, Oxford University Press 2018).

Roberts, Sir Adam, 'Future War, Future Law: A Historical Approach' in Matthew C. Waxman & Thomas W. Oakley (eds) *The Future Law of Armed Conflict* (Lieber Studies Vol 7, Oxford University Press 2022).

Sachdeva, GS, 'Outer Space Treaty: An Appraisal' in Ajey Lele (ed), *50 Years of the Outer Space Treaty: Tracing the Journey* (Pentagon Press 2017).

Schmitt, Michael N., 'International Law and Military Operations in Space' in A von Bogdandy and R Wolfrum (eds) *Max Planck Yearbook of United Nations Law* (Vol 10 Brill 2006).

Schmitt, Michael N., 'Introduction' in International Group of Experts at the Invitation of the NATO Cooperative Cyber Defence Centre of Excellence, *Tallinn Manual on the International Law Applicable to Cyber Warfare* (Cambridge University Press 2013).

Schneider, Tapio, 'Climate 1970 – 2020' in Philippe Tortell, *Earth 2020: An Insider's Guide to a Rapidly Changing Planet* (Open Book Publishers 2020).

Steer, Cassandra and Stephens, Dale, 'International Humanitarian Law and Its Application in Outer Space' in Cassandra Steer and Matthew Hersch (eds) *War and Peace in Outer Space: Law, Policy, and Ethics* (Oxford University Press 2021).

Su, Jinyuan, 'The Legal Challenge of Arms Control in Space' in Cassandra Steer and Matthew Hersch (eds), *War and Peace in Outer Space: Law, Policy, and Ethics* (Oxford University Press 2021).

Topychkanov, Petr, 'Features of the Outer Space Environment' in Alexei Arbatov & Vladimir Dvorkin (eds) *Outer Space: Weapons, Diplomacy, and Security* (Carnegie Endowment for International Peace 2010).

Tronchetti, Fabio, 'Legal Aspects of the Military Uses of Outer Space' in Frans von der Dunk and Fabio Tronchetti (eds), *Handbook of Space Law* (Edward Elgar Publishing 2015).

Von der Dunk, Frans, 'International space law' in Frans von der Dunk and Fabio Tronchetti (eds), *Handbook of Space Law* (Edward Elgar Publishing 2015).

## **Journal Articles**

Abbott, Kenneth W. and Snidal, Duncan, 'Hard and Soft Law in International Governance' (2000) 54(3) *International Organization* 421.

Abt, Clark C., 'Disarmament as a Strategy' (1963) 7(3) *The Journal of Conflict Resolution* 293.

Albon, Lillian, Binnedijk, Anika et al, 'Operationalizing Cyberspace as a Military Domain' (2019) *Perspective Expert Insights on a Timely Policy Issue* 1.

Alexander, Amanda, 'A Short History of International Humanitarian Law' (2015) 26(1) *The European Journal of International Law* 109.

Allott, Philip, 'Reconstituting Humanity – New International Law' (1992) 3 *European Journal of International Law* 219.

Bachrach, Bernard S, 'Medieval Siege Warfare: A Reconnaissance' (1994) 58(1) *The Journal of Military History* 119.

Bass, Gary J, 'Jus Post Bellum' (2004) 32(4) *Philosophy & Public Affairs* 384.

Becheru, Valentin, and Stan, Adrian, 'Humanity, from Peaceful Exploration of Outer Space to Its Conquest through Space Forces, Anti-Satellite Weapons and State of the Art Space Technologies' (2019) 11(1) *Annals – Series on Military Sciences* 68.

Blondel, Jean-Luc, 'The meaning of the word 'humanitarian' in relation to the Fundamental Principles of the Red Cross and the Red Crescent' (1989) 273 *International Review of the Red Cross* 507.

Blount, P. J., 'Renovating Space: The Future of International Space Law' (2011) 40 *Denver Journal of International Law and Policy* 515.

Boothby, William, 'Space Weapons and the Law' (2017) 93 *International Law Studies* 179.

Bowen, Bleddyn E., 'Cascading Crises: Orbital Debris and the Widening of Space Security' (2014) 12 *Astropolitics* 46.

Bring, Ove, 'Regulating Conventional Weapons in the Future. Humanitarian Law or Arms Control' (1987) 24(3) *Journal of Peace Research* 275.

Bueckling, Adrian, 'The Strategy of Semantics and the Mankind Provisions of the Space Treaty' (1979) 7 *Journal of Space Law* 15.

Bull, Hedley, 'Arms Control and World Order' (1976) 1(1) *International Security* 3.

Cameron, Lindsey, 'Private military companies: their status under international humanitarian law and its impact on their regulation' (2006) 88(863) *International Review of the Red Cross* 573.

Cassese, Antonio, 'The Martens Cause: Half a Loaf or Simply Pie in the Sky?' (2000) 11(1) *European Journal of International Law* 187.

Chaben, Jack B., 'Extending Humanity's Reach: A Public-Private Framework for Space Exploration' (2020) 13(3) *Journal of Strategic Security* 75.

Chetail, Vincent, 'The Fundamental Principles of Humanitarian Law Through the Case Law of the International Court of Justice' (2002) 21(3) *Refugee Survey Quarterly* 199.

Chinkin, Christine M., 'The Challenge of Soft Law: Development and Change in International Law' (1989) 38(4) *The International and Comparative Law Quarterly* 850.

Chow, Brian G, 'Space Arms Control: A Hybrid Approach' (2018) 12(2) *Strategic Studies Quarterly* 107.

Collins, Christy, 'Territories beyond possession? Antarctica and Outer Space' (2017) 7(2) *The Polar Journal* 287.

Coupland, Robin and Leins, Kobi- Renée, 'Science and Prohibited Weapons' (2005) 308(5730) *Science* 1841.

Coupland, Robin and Loye, Dominique, 'The 1899 Hague Declaration Concerning Expanding Bullets. A treaty effective for more than 100 years faces complex contemporary issues' (2003) 85(849) *International Review of the Red Cross* 135.

Coupland, Robin, 'Humanity: What is it and how does it influence international law?' (2001) 83(844) *International Review of the Red Cross* 969.

Coursier, Henri, 'Etudes sur la formation du droit humanitaire : Les idées humanitaires et le droit romain' (1951) 389 *International Review of the Red Cross* 370.

Crawford, Emily, 'The Modern Relevance of the Martens Clause' (2006) 6 *ISIL Yearbook of International Humanitarian and Refugee Law* 1.

Crawford, Timothy W. and Vu, Khang X., 'Arms Control as Wedge Strategy: How Arms Limitation Deals Divide Alliances' (2021) 46(2) *International Security* 91.

Crutzen, Paul J and Stoermer, Eugene F, 'The Anthropocene' (2000) 41 *Global Change Newsletter* 17-18.

D'Aspremont, Jean, 'Softness in International Law: A Self-Serving Quest for New Legal Materials' (2008) 19(5) *The European Journal of International Law* 1075.

Doboš, Bohumil, and Pražák, Jakub, 'Master spoiler: a strategic value of Kessler Syndrome' (2022) 22(1) *Defence Studies* 123.

Docherty, Bonnie, 'A 'light for all humanity': the treaty on the prohibition of nuclear weapons and the progress of humanitarian disarmament' (2018) 30(2) *Global Change, Peace and Security* 163.

Dolman, Everett C., 'A Debate About Weapons in Space: For U.S. Military Transformation and Weapons in Space' (2006) 26(1) *SAIS Review of International Affairs* 163.

Doswald-Beck, Louise, 'International Humanitarian Law and the Advisory Opinion of the International Court of Justice on the legality of the threat or use of nuclear weapons' (1997) 321 *International Review of the Red Cross* 35.

Doswald-Beck, Louise, 'The San Remo Manual on International Law Applicable to Armed Conflicts at Sea' (1995) 89(1) *The American Journal of International Law* 192, 193.

Downey Jr., William Gerald, 'The Law of War and Military Necessity' (1953) 47(2) *The American Journal of International Law* 251.

Droege, Cordula and Giorgou, Eirini, 'How international humanitarian law develops' (2022) 104(920-921) *International Review of the Red Cross* 1798.

Efrony, Dan and Shany, Yuval, 'A Rule Book on the Shelf? Tallinn Manual 2.0 on Cyberoperations and Subsequent State Practice' (2018) 112(4) *The American Journal of International Law* 583.

Evans, Tyler D., 'At War with the Robots: Autonomous Weapon Systems and the Martens Clause' (2013) 41 *Hofstra Law Review* 697.

Falk, Richard A., 'The Shimoda Case: A Legal Appraisal of the Atomic Attacks Upon Hiroshima and Nagasaki' (1965) 59(4) *The American Journal of International Law* 759.

Fasan, Ernst, 'The Meaning of the Term Mankind in Space Legal Language' (1974) 2 Journal of Space Law 125.

Fast, Larissa, 'Unpacking the principle of humanity: Tensions and implications' (2015) 97 International Review of the Red Cross 111.

Faulkner, Raymond Oliver, 'The Battle of Megiddo' (1942) 28 The Journal of Egyptian Archaeology 2.

Ferreira-Snyman, Anél, and Ferreira, Gerrit M, 'The Application of International Human Rights Instruments in Outer Space Settlements: Today's Science Fiction, Tomorrow's Reality' (2019) 22 Potchefstroom Electronic Law Journal 1.

Fidler, David P., 'International Law and Weapons of Mass Destruction: End of the Arms Control Approach?' (2004) 417 Articles by Maurer Faculty 39.

Finnegan, Ciara, 'Indigenous Interests in Outer Space: Addressing the Conflict of Increasing Satellite Numbers with Indigenous Astronomy Practices' (2022) 11(26) Laws.

Foggo, James G and Fritz, Alarik, 'X. NATO and the Challenge in the North Atlantic and the Arctic' (2018) 93(1) Whitehall Papers 121.

Freeland, Steven, 'In Heaven as on Earth? The International Legal Regulation of the Military Use of Outer Space' (2011) 8 U.S.-China Law Review 272.

Freeland, Steven, 'Peaceful Purposes – Governing the Military Uses of Outer Space' (2016) 18(1) European Journal of Law Reform 35.

Gardam, Judith, & Charlesworth, Hilary, 'Protection of Women in Armed Conflict' (2000) 22(1) Human Rights Quarterly 148.

Geib, Robin, 'War and Law in Cyberspace' (2010) American Society of International Law Proceedings of Annual Meeting 371.

Ghosh, C.N., 'EMP weapons' (2000) 24(7) *Strategic Analysis* 1333.

Gibbs, Norman H, 'Clausewitz on the Moral Forces in War' (1975) 27(4) *Naval War College Review* 15.

Giladi, Rotem, 'The Enactment of Irony: Reflections on the Origins of the Martens Clause' (2014) 25(3) *The European Journal of International Law* 847.

Goldie, 'A Note on Some Diverse Meanings of "The Common Heritage of Mankind"' (1983) 10(1) *Syracuse Journal of International Law and Commerce* 69.

Gottschalk, Keith, 'The Roles of Africa's Institutions in Ensuring Africa's Active Participation in the Space Enterprise: The Case for an African Space Agency' (2008) 12 *African Skies* 26.

Graham, Lieutenant Colonel David E, 'Operational Law (OPLAW) – A Concept Comes of Age' (1987) *Army Law* 9.

Granger, Frank, 'Aristotle's Theory of Reason' (1983) 2(7) *Mind* 307.

Greene, Leslie C., 'The Law of War in Historical Perspective' (1998) 72 *International Law Studies* 39.

Gruner, Brandon C., 'A New Hope for International Space Law: Incorporating Nineteenth Century First Possession Principles into the 1967 Space Treaty for the Colonization of Outer Space in the Twenty-First Century' (2004) 35(1) *Seton Hall Law Review* 299.

Guzman, Andrew T. and Meyer, Timothy L., 'International Soft Law' (2010) 2(1) *Journal of Legal Analysis* 171.

Haines, Steven, 'War at sea: Nineteenth-century laws for twenty-first century wars?' (2016) 98(2) *International Review of the Red Cross* 419.

Hantke-Domas, Michael, 'The Public-Interest Theory of Regulation: Non-Existence or Misinterpretation?' (2003) 15 *European Journal of Law and Economics* 165.

Harris, Alexandra, and Harris, Ray, 'The need for air space and outer space demarcation' (2006) 22 *Space Policy* 3.

Harrison, Roger G, 'Unpacking the Three C's: Congested, Competitive, and Contested Space' (2013) 11 *Astropolitics* 123.

Hillgenberg, Hartmut, 'A Fresh Look at Soft Law' (1999) 10 *European Journal of International Law* 499.

Hobe, Stephan, 'Legal Aspects of Space Tourism' (2007) 86(2) *Nebraska Law Review* 439.

Hobe, Stephan, 'The Impact of New Developments on International Space Law (New Actors, Commercialisation, Privatisation, Increase in the Number of Space-Faring Nations)' (2010) 15(3 & 4) *Uniform Law Review* 869.

Houlihan, James W., '*Lex Innocentium* (697 AD): Adomnán of Iona – father of Western *jus in bello*' (2019) 101(911) *International Review of the Red Cross* 715.

Hughes, R. Gerald, 'Carl Von Clausewitz and his Philosophy of War: The Evolution of a Reputation 1831-2021' (2020) 105(386) *The Journal of the Historical Association* 773.

Hulme, Karen, 'The 2008 Cluster Munitions Convention: Stepping outside the CCW Framework (Again)' (2009) 58(1) *The International and Comparative Law Quarterly* 219.

Hutchinson, Terry, 'The Doctrinal Method: Incorporating Interdisciplinary Methods in Reforming the Law' (2015) 8(3) *Erasmus Law Review* 130.

Hutchinson, Terry, 'Valé Bunny Watson: Law Librarians, Law Libraries, and Legal Research in the Post-Internet Era' (2014) 106(4) *Law Library Journal* 579.

Isnardi, Christina, 'Problems with Enforcing International Space Law on Private Actors' (2020) 58 Columbia Journal of Transnational Law 489.

Ivanenko, Vitaliy, 'The origins, causes and enduring significance of the Martens Clause: A view from Russia' (2022) 104(920-921) International Review of the Red Cross 1708.

Jakhu, Ram S, Chen, Kuan-Wei and Goswami, Bayar, 'Threats to Peaceful Purposes of Outer Space: Politics and Law' (2020) 18(1) Astropolitics 22.

Jasani, Bhupendre, 'Outer Space Being Turned into a Battlefield' (1986) 17(1) Bulletin of Peace Proposals 29.

Jensen, Eric Talbot, 'The Future of the Law of Armed Conflict: Ostriches, Butterflies, and Nanobots' (2014) 35 Michigan Journal of International Law 253.

Johnson, Nicholas L., 'Operation Burnt Frost: A View from Inside' (2021) 56 (101411) Space Policy 1.

Joyner, Christopher C, 'Legal Implications of the Concept of the Common Heritage of Mankind' (1986) 35(1) The International and Comparative Law Quarterly 190.

Khan, Jeffrey, 'Protection and Empire: The Martens Clause, State Sovereignty, and Individual Rights' (2016) 56 Virginia Journal of International Law 1.

Khatwani, Naman, 'Common Heritage of Mankind for Outer Space' (2019) 17(2) Astropolitics 89.

Klabbers, Jan, 'The Undesirability of Soft Law' (1998) 67(4) Nordic Journal of International Law 381.

Koch, Jonathan Sydney, 'Institutional Framework for the Province of all Mankind: Lessons from the International Seabed Authority for the Governance of Commercial Space Mining' (2018) 16 Astropolitics 1.

Kolb, Robert, 'Origin of the Twin Terms *jus ad bellum/jus in bello*' (1997) 37(320) *International Review of the Red Cross* 553.

Kopec, Rafał, 'Space Deterrence: In Search of a 'Magical Formula'' (2019) 47 *Space Policy* 121.

Koplow, David A, 'Asat-ification: Customary International Law and the Regulation of Anti-Satellite Weapons' (2009) 30(4) *Michigan Journal of International Law* 1187.

Kreps, Sarah E., 'The Institutional Design of Arms Control Agreements' (2018) 14 *Foreign Policy Analysis* 127.

Kuplic, Blair Stephenson, 'The Weaponization of Outer Space: Preventing an Extraterrestrial Arms Race' (2014) 39(4) *North Carolina Journal of International Law and Commercial Regulation* 1123.

Lambakis, Steven, 'Space control in Desert Storm and beyond' (1995) 39(3) *ORBIS* 417.

Langbroek, Philip, Van den Bos, Kees, Simon Thomas, Marc, Milo, Michael and Van Rossum, Wibo, 'Methodology of Legal Research: Challenges and Opportunities' (2017) 13(3) *Utrecht Law Review* 1.

Latimer Martinez, Katherine, 'Lost in Space: An Exploration of the Current Gaps in Space Law' (2021) 11(2) *Seattle Journal of Technology, Environmental and Innovation Law* 322.

Leisure, Patrick, 'The Martens Clause, Global Pandemics, and the Law of Armed Conflict' (2021) 62(2) *Harvard Journal of International Law* 469.

Lewis, Angeline, 'Conflating Conscience and Legality in International Law: Implications for the Future' (2019) 40(2) *Adelaide Law Review* 447.

Liu, Hao and Tronchetti, Fabio, 'United Nations Resolution 69/32 on the 'No first placement of weapons in space': A step forward in the prevention of an arms race in outer space?' (2016) 38 Space Policy 64.

Lubert, Caroline P, 'From Sputnik to SpaceX: 60 Years of Rocket Launch Acoustics' (2018) 14(4) Acoustics Today 38.

Maogoto, Jackson Nyamuya, and Freeland, Steven, 'Space Weaponization and the United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?' (2007) 41(4) The International Lawyer 1091.

May, Larry, 'Hobbes, law, and public conscience' (2016) 19(1) Critical Review of International Social and Political Philosophy 12.

McDowell, Jonathan C., 'The Low Earth Orbit Satellite Population and Impacts of the SpaceX Starlink Constellation' (2020) 892(2) The Astrophysical Journal Letters 1.

McNab, I.R. and Beach, F.C., 'Naval Railguns' (2007) 43(1) IEEE Transactions on Magnetics 463.

Mendonça, Helena, Cocco Correia Magda and Macedo Scavuzzi dos Santos, Juliana, 'International Laws Regulating Satellite Communications and Their Intentional Disruption in Times of Peace and Conflict' (2015) 40 Annals Air & Space Law 105.

Meron, Theodor, 'The Geneva Conventions and Public International Law British Foreign and Commonwealth Office Conference commemorating the 60th Anniversary of the 1949 Geneva Conventions, London, 9 July 2009' (September 2009) 91(875) International Review of the Red Cross 619, 625.

Meron, Theodor, 'The Geneva Conventions as Customary Law' (1987) 81(2) The American Journal of International Law 348.

Meron, Theodor, 'The Humanization of Humanitarian Law' (2000) 94(2) *The American Journal of International Law* 239.

Meron, Theodor, 'The Martens Clause, Principles of Humanity, and Dictates of Public Conscience' (2000) 94(1) *The American Journal of International Law* 78.

Mickevičiūtė, Neringa, 'Lessons from the Past for Weapons of the Future' (2016) 2 *International Comparative Justice* 99.

Milanovic, Marco and Sivakumaran, Sandesh, 'Assessing the Authority of the ICRC Customary IHL Study: How Does IHL Develop?' (2022) 104(920-921) *International Review of the Red Cross* 1856.

Mineiro, Michael C., 'FY-1C and USA-193 ASAT Intercepts: An Assessment of Legal Obligations under Article IX of the Outer Space Treaty' (2008) 34(2) *Journal of Space Law* 321.

Mirzaee, Siavash, 'Outer Space and Common Heritage of Mankind: Challenges and Solutions' (2017) 21(1) *Rund Journal of Law* 102.

Moelker, René, and Kümmel, Gerhard, 'Chivalry and Codes of Conduct: Can the Virtue of Chivalry Epitomize Guidelines for Interpersonal Conduct?' (2007) 6(4) *Journal of Military Ethics* 292.

Moffett, Luke, 'A Bridge Too Far? Attacks against Cultural Property used as Military Objectives as War Crimes: The *Prlić et al.* Case and the Mostar Bridge' (2020) 20 *International Criminal Law Review* 214.

Morley, Jefferson, 'Chemical Watchdog Wins Nobel Prize' (2013) 43(9) *Arms Control Today* 38.

Murthy, K.R.S., 'MOU: More Memorandum than Understanding' (1990) 25(21) Economic and Political Weekly M-59.

Nadali, Davide, 'How Many Soldiers on "The Stele of the Vultures"? A Hypothetical Reconstruction' (2014) 76 Iraq 141.

Nightingale, Pamela, 'Knights and Merchants: Trade, Politics and Gentry in Late Medieval England' (2000) 169 Past and Present 36.

Olson, Valerie and Messeri, Lisa, 'Beyond the Anthropocene: Un-Earthing an Epoch' (2015) 6 Environment and Society: Advances in Research 28.

Otto, Dianne, 'The Exile of Inclusion: Reflections on Gender Issues in International Law over the Last Decade' (2009) 1(10) Melbourne Journal of International Law 11.

Park, Won-hwa, 'Recent space developments in South Korea' (2010) 26 Space Policy 117.

Paust, Jordan J., 'Controlling Prohibited Weapons and the Illegal Use of Permitted Weapons' (1983) 28(3) McGill Law Journal 608.

Petras, Christopher, 'The Debate over the Weaponization of Space – A Legal-Military Conspectus' (2003) 28 Annals of Air and Space Law 171.

Pictet, Jean, 'The Principles of International Humanitarian Law (II)' (1966) 67 International Review of the Red Cross 511.

Pictet, Jean, 'The Principles of International Humanitarian Law' (1966) 66 International Review of the Red Cross 455.

Ping Li, Peter and Yang, Monsol, 'How to Approach the Ancient Chinese Wisdom? A Commentary Concerning Sun Tzu's *The Art of War*' (2017) 13(4) Management and Organization Review 913.

Prosser, Tony, 'Regulation and Social Solidarity' (2006) 33(3) *Journal of Law and Society* 364.

Pustogarov, Vladimir V., 'The Martens Clause in International Law' (1999) 1 *Journal of the History of International Law* 125.

Quinn, Adam G., 'The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space' (2008) 17 *Minnesota Journal of International Law* 475.

Rajagopalan, Rajeswari Pillai, 'India's Changing Policy on Space Militarization: The Impact of China's ASAT Test' (2011) 10(4) *India Review* 354.

Rajan, Sanoj, 'Principles of Laws of War in Ancient India and the Concept of Mitigating Armed Conflicts through Controlled Fights' (2014) 5 *Journal of International Humanitarian Legal Studies* 333.

Ramey, Robert A., 'Armed Conflict on the Final Frontier: The Law of War in Space' (2000) 48 *Air Force Law Review* 1.

Reddy, Karunanidhi, 'The Regulation of Chemical and Biological Weapons in International Law: Preserving the Paradox of Humane War' (2008) 2008 *Journal of South African Law* 669.

Redfield, Peter, 'The Half-Life of Empire in Outer Space' (2002) 32(5/6) *Social Studies of Science* 791.

Reeves, Shane R., Alcalá, Ronald T. P. and McCarthy, Amy, 'Challenges in Regulating Lethal Autonomous Weapons under International Law' (2021) 27(1) *Southwestern Journal of International Law* 101.

Roach, J. Ashley, 'Rules of Engagement' (1983) 36 *Naval College War Review* 46.

Robison, Christian Joseph, 'Changing Responsibility of a Changing Environment: Revaluating the Traditional Interpretation of Article VI of the Outer Space Treaty in Light of Private Industry' (2020) 5(1) University of Bologna Law Review 1.

Rogers, Jay Logan, 'Lethal Judgment Day for the Rise of the Machines: A National Approach to Regulating Fully Autonomous Weapons' (2014) 56(4) Arizona Law Review 1257.

Rose, Sir Clive, 'Multiple Approaches to Arms Control and Disarmament' (1982) 38(11) The World Today 422.

Rosenfield, Stanley B, 'Where Air Space Ends and Outer Space Begins' (1979) 7(2) Journal of Space Law 137.

Roth, Martha T, 'Mesopotamian Legal Traditions and the Laws of Hammurabi' (1995) 71(1) Chicago-Kent Law Review 13.

Salter, Michael, 'Reinterpreting Competing Interpretations of the Scope and Potential of the Martens Clause' (2012) 17(3) Journal of Conflict and Security Law 403.

Sassòli, Marco, 'How will international humanitarian law develop in the future?' (2022) 104(920-921) International Review of the Red Cross 2052.

Schick, F.B., 'Problems of a Space Law in the United Nations' (1964) 13(3) The International and Comparative Law Quarterly 969.

Schmitt, Michael N. and Watts, Sean, 'The Decline of International Humanitarian Law Opinio Juris and the Law of Cyber Warfare' (2015) 50 Texas International Law Journal 189.

Simsarian, James, 'Outer Space Co-Operation in the United Nations in 1963' (1964) 58(3) The American Journal of International Law 717.

Sinha, Manoj Kumar, 'Hinduism and international humanitarian law' (2005) 87(858) International Review of the Red Cross 285.

Slim, Hugo, 'Sharing a Universal Ethic: The Principle of Humanity in War' (1998) 2(4) The International Journal of Human Rights 28.

Smith, Colin, and Gallen, James, 'Cáin Adomnáin and the Laws of War' (2014) 16 Journal of the History of International Law 63.

Smith, Tara, 'Challenges in identifying binding Martens Clause rules from the 'dictates of public conscience' to protect the environment in non-international armed conflict' (2019) 10(2) Transnational Legal Theory 184.

Stapleton-Coory, Mitchell, 'The Enduring Legacy of the Martens Clause: Resolving the Conflict of Morality in International Humanitarian Law' (2019) 40(2) Adelaide Law Review 471.

Steele, Air Commodore David, 'The Weaponisation of Space: The Next Arms Race?' (2008) Australian Defence Force Journal 17.

Steer, Cassandra, 'Global Commons, Cosmic Commons: Implications of Military and Security Uses of Outer Space' (2017) 18(1) Georgetown Journal of International Affairs 9.

Su, Jinyuan, 'The "peaceful purposes" principle in outer space and the Russia-China PPWT Proposal' (2010) 26 Space Policy 81.

Su, Jinyuan, 'Use of Outer Space for Peaceful Purposes: Non-Militarization, Non-Aggression and Prevention of Weaponization' (2010) 36(1) Journal of Space Law 253.

Sweijts, Tim and Osinga, Frans, 'VIII. Maintaining NATO's Technological Edge' (2019) 95(1) Whitehall Papers 104.

Taekema, Sanne, 'Methodologies of Rule of Law Research: Why Legal Philosophy Needs Empirical and Doctrinal Scholarship' (2021) 40(1) *Law & Philosophy* 33.

Tan, David, 'Towards a New Regime for the Protection of Outer Space as the Province of All Mankind' (2000) 24 *Yale Journal of International Law* 145.

Teitel, Ruti, 'For Humanity' (2004) 3(2) *Journal of Human Rights* 225.

Thompson, Lt Gen David, Gagnon, Col Gregory J and McLeod, Maj Christopher, 'Space as a War-fighting Domain' (2018) *Air & Space Power Journal* 4.

Ticehurst, Rupert, 'The Martens Clause and the Laws of Armed Conflict' (1997) 317 *International Review of the Red Cross* <<https://www.icrc.org/en/doc/resources/documents/article/other/57jnhy.htm>> accessed 26 September 2023.

Tiller, Emerson H. and Cross, Frank B., 'What Is Legal Doctrine' (2006) 100(1) *Northwestern University Law Review* 517.

Urban, Jennifer Ann, 'Soft Law: The Key to Security in a Globalized Outer Space' (2016) 43 *Transportation Law Journal* 33.

Van Dijk-Coombes, Renate Marian, 'Lions and winged things: A proposed reconstruction of the object on the right of the lower register of the mythological side of Eannatum's Stele of the Vultures' (2017) 47(2) *Die Welt des Orients* 198.

Vašák, Karel, 'Human Rights: A Thirty-Year Struggle: the Sustained Efforts to give Force of law to the Universal Declaration of Human Rights' (1977) 11 *UNESCO Courier* 29.

Veech, Stephanie D., 'To Infinity and beyond: The History of Space Travel and the Legal Implications of Privatized Space Flight through the Lens of SpaceX' (2019) 18(1) *Loyola Maritime Law Journal* 151.

Vereshchetin, Vladlen S., & Danilenko, Gennady M., 'Custom as a Source of International Law of Outer Space' (1985) 13(1) *Journal of Space Law* 22.

Vogel, Ryan J., 'Drone Warfare and the Law of Armed Conflict' (2010) 39(1) *Denver Journal of International Law and Policy* 101.

Warren, Marc L., 'Operational Law – A Concept Matures' (1996) 152 *Military Law Review* 33.

Watts, Sean, 'Regulation-Tolerant Weapons, Regulation-Resistant Weapons and the Law of War' (2015) 91 *International Law Studies* 540.

Weil, Prosper, 'Towards Relative Normativity in International Law?' (1983) 77(3) *The American Journal of International Law* 413.

Wexler, Lesley, 'Limiting the Precautionary Principle: Weapons Regulation in the Face of Scientific Uncertainty' (2006) 39(2) *U.C. Davis Law Review* 459.

Williamson Jr, Richard L., 'Hard Law, Soft Law, and Non-Law in Multilateral Arms Control: Some Compliance Hypotheses' (2003) 4(1) *Chicago Journal of International Law* 59.

Winter, Elliot, 'Pillars not Principles: The Status of Humanity and Military Necessity in the Law of Armed Conflict' (2020) 25 *Journal of Conflict & Security Law* 1.

Wolff, Major Joshua J., 'Space Law: What It Is and Why It Matters' (2020) 5 *Army Lawyer* 66.

Wolter, Detlev, 'The Peaceful Purpose Standard of Common Heritage of Mankind Principle in Outer Space Law' (1985) 9 *ASILS International Law Journal* 117.

Zak, Anatoly, 'The 'K' Project: Soviet Nuclear Tests in Space' (2006) 13(1) *Non-proliferation Review* 143.

Zieck, Marjoleine Y.A., 'The Concept of 'Generations' of Human Rights and the Right to Benefit from the Common Heritage of Mankind with Reference to Extraterrestrial Realms' (1992) 25(2) Law and Politics in Africa, Asia and Latin America 161.

## Reports

Centre for Strategic and International Studies, 'Space Threat Assessment 2023' (April 2023) <[https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414\\_Bingen\\_Space\\_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ](https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-04/230414_Bingen_Space_Assessment.pdf?VersionId=oMsUS8MupLbZi3BISPrqPCKd5jDejZnJ)>.

Human Rights Watch, 'Heed the Call: A Moral and Legal Imperative to Ban Killer Robots' (21 August 2018) <<https://www.hrw.org/report/2018/08/21/heed-call/moral-and-legal-imperative-ban-killer-robots>>.

Anderson, Major Douglas S., 'A Military Look Into Space: The Ultimate High Ground' (1995) Department of the Army Pamphlet 27-50-276 19.

Weedon, Dr Brian and Samson, Victoria (eds), 'Global Counterspace Capabilities: An Open Source Assessment' (Secure World Foundation April 2023) <[https://swfound.org/media/207567/swf\\_global\\_counterspace\\_capabilities\\_2023\\_v2.pdf](https://swfound.org/media/207567/swf_global_counterspace_capabilities_2023_v2.pdf)>

West, Jessica and Vyse, Lauren, 'Ploughshares Report Arms Control in Outer Space: Status, Timeline and Analysis' (Project Ploughshares, March 2022) <[https://uploads-ssl.webflow.com/63e066081ef50cb16a3f4157/644703880fc91ec0120d6a79\\_ArmsControlOuterSpace\\_Report.pdf](https://uploads-ssl.webflow.com/63e066081ef50cb16a3f4157/644703880fc91ec0120d6a79_ArmsControlOuterSpace_Report.pdf)>.

## **Conference Papers**

Hall, Loretta, 'The History of Space Debris' (Space Traffic Management Conference, Daytona Beach, November 2014)

<<https://commons.erau.edu/cgi/viewcontent.cgi?article=1000&context=stm>>.

Lal, Bhavya, and Nightingale, Emily, 'Where is Space? And Why Does That Matter?' (2014) Space Traffic Management Conference 16

<<https://commons.erau.edu/cgi/viewcontent.cgi?article=1052&context=stm>>.

Jakhu, Prof Ram S, and Freeland, Prof Steven, 'The Relationship Between the Outer Space Treaty and Customary International Law' (2016) 59<sup>th</sup> ISIL Colloquium on the Law of Outer Space.

## **Discussion Paper**

Risse, Mathias, 'The Fourth Generation of Human Rights: Epistemic Rights in Digital Lifeworlds' (2021) Carr Centre for Human Rights Policy, Harvard Kennedy School, Harvard University Discussion Paper, 8.

## **International Law Commission Document**

International Law Commission, 'Draft conclusions on identification of customary international law' (2018) submitted in General Assembly in report A/73/10, para 65.

## **Handbook**

Smith, Major Micah (ed), *Operational Law Handbook 2022* (2022) <  
[https://tile.loc.gov/storage-services/service/l1/l1mlp/operations-law-handbook\\_2022/operations-law-handbook\\_2022.pdf](https://tile.loc.gov/storage-services/service/l1/l1mlp/operations-law-handbook_2022/operations-law-handbook_2022.pdf)>.

## **Thesis**

Adanan, Amina, ‘Allies and enemies, past and present: An analysis of the rationale for the development of universal jurisdiction over serious crimes under international law’ (PhD Thesis, National University of Ireland, Galway, 2017).

## **ICRC Customary International Humanitarian Law Database**

ICRC International Humanitarian Law Database, ‘Convention on the prohibition of military or any hostile use of environmental modification techniques, 10 December 1976.’ <<https://ihl-databases.icrc.org/en/ihl-treaties/enmod-1976>>.

ICRC International Humanitarian Law Database, ‘Customary IHL: Introduction’ <<https://ihl-databases.icrc.org/en/customary-ihl/v1/in>>.

ICRC International Humanitarian Law Database, ‘Customary IHL’ <<https://ihl-databases.icrc.org/en/customary-ihl/v1>>.

ICRC International Humanitarian Law Database, ‘Project of an International Declaration concerning the Laws and Customs of War. Brussels, 27 August 1874’ <<https://ihl-databases.icrc.org/ihl/INTRO/135>>.

ICRC International Humanitarian Law Database, ‘Rule 70: Weapons of a Nature to Cause Superfluous Injury and Unnecessary Suffering’ < <https://ihl-databases.icrc.org/en/customary-ihl/v1/rule70>>.

ICRC International Humanitarian Law Database, ‘Treaties, States Parties and Commentaries: Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of Non-International Armed Conflicts (Protocol II), 8 June 1977., Commentary of 01.01.1987, Preamble’ < <https://ihl-databases.icrc.org/en/ihl-treaties/apii-1977/preamble/commentary/1987?activeTab=undefined>>.

ICRC International Humanitarian Law Databases, ‘Rules’ <<https://ihl-databases.icrc.org/en/customary-ihl/v1>>.

ICRC International Humanitarian Law Databases, ‘Practice relating to Rule 24. Removal of Civilians and Civilian Objects from the Vicinity of Military Objectives’ <<https://ihl-databases.icrc.org/en/customary-ihl/v2/rule24?country=kw>> .

## **Online Sources**

‘Political Declaration on Strengthening the Protection of Civilians from the Humanitarian Consequences arising from the use of Explosive Weapons in Populated Areas’ (Department of Foreign Affairs, 18 November 2022) < <https://www.dfa.ie/our-role-policies/international-priorities/peace-and-security/ewipa-consultations/>>.

African Union, ‘Statute of the African Space Agency’ <[https://au.int/sites/default/files/treaties/36198-treaty-statute\\_african\\_space\\_agency\\_e.pdf](https://au.int/sites/default/files/treaties/36198-treaty-statute_african_space_agency_e.pdf)> .

Al-Dawoody, Ahmed, 'IHL and Islam: An Overview' (Humanitarian Law and Policy Blog, 14 March 2017) <<https://blogs.icrc.org/law-and-policy/2017/03/14/ihl-islam-overview/>>.

Asia-Pacific Regional Space Agency Forum, 'About APRSAF' <<https://www.aprsaf.org/about/>>.

Asia-Pacific Regional Space Agency Forum, 'Annual Meetings' <[https://www.aprsaf.org/annual\\_meetings/](https://www.aprsaf.org/annual_meetings/)>.

Asia-Pacific Regional Space Agency Forum, 'Countries and Regions' <<https://www.aprsaf.org/participants/>>.

Asia-Pacific Regional Space Agency Forum, 'International Organizations' <[https://www.aprsaf.org/participants/international\\_organizations.php](https://www.aprsaf.org/participants/international_organizations.php)>.

Asia-Pacific Regional Space Agency Forum, 'Principles of APRSAF' <<https://www.aprsaf.org/about/pdf/Principles.pdf>>.

BBC News, 'Chandrayaan-3: India makes historic landing near Moon's south pole' (23 August 2023) <<https://www.bbc.com/news/world-asia-india-66594520>>.

BBC News, 'Space Force: Trump officially launches new US military service' (21 December 2019) <<https://www.bbc.com/news/world-us-canada-50876429>>.

Bennett, Charlie JP, 'A Future 'EU Space Law': A Few Constitutional Considerations' (EJIL: Talk!, 8 August 2023) <<https://www.ejiltalk.org/a-future-eu-space-law-a-few-constitutional-considerations/>>.

Bhattacharjee, Nivedita, 'India closes in on moon landing as Russia also races to lunar south pole' (Reuters, 18 August 2023) <<https://www.reuters.com/technology/space/india-closes-moon-landing-russia-also-races-lunar-south-pole-2023-08-18/>>.

Boreli, Silvia, 'The (Mis)-Use of General Principles of Law: Lex Specialis and the Relationship between International Human Rights Law and the Laws of Armed Conflict' (2015) <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2575076](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2575076)>.

Bouchat, Clarence J., 'An Introduction to Theater Strategy and Regional Security' (2007) Army War College Strategic Studies Institute Carlisle Barracks <<https://apps.dtic.mil/sti/citations/ADA470925> >.

Burgess, John, 'Satellites' Gaze Provides New Look at War' (The Washington Post, 19 February 1991) <<https://www.washingtonpost.com/archive/politics/1991/02/19/satellites-gaze-provides-new-look-at-war/768b19e4-a1da-4f40-8267-28a5dda48726/> >.

CCDCOE, 'The CCDCOE Invites Experts to Contribute to the Tallinn Manual 3.0' <<https://ccdcoe.org/news/2021/the-ccdcoe-invites-experts-to-contribute-to-the-tallinn-manual-3-0/>>.

Chilton, General Kevin, 'The anti-satellite test ban must not undermine deterrence' (Defence News, 29<sup>th</sup> April 2022) <<https://www.defensenews.com/opinion/commentary/2022/04/29/the-anti-satellite-test-ban-must-not-undermine-deterrence/>>.

Code of Federal Regulations. 2022. Title 47: Telecommunication, <<https://www.ecfr.gov/current/title-47/chapter-I> >.

Crootof, Rebecca, 'Regulating New Weapons Technology' (June 14, 2018) in 'The Impact of Emerging Technologies on the Law of Armed Conflict' by Eric Talbot Jensen & Ronald T.P. Alcalá (eds) (Oxford University Press 2019 forthcoming) <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3195980](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3195980)>.

Dobrijevic, Daisy and May, Andrew, ‘The Kármán Line: Where does space begin?’ (Space.com, 14 November 2022) < <https://www.space.com/karman-line-where-does-space-begin>>.

Erwin, Sandra, ‘U.S. declares ban on anti-satellite missile tests, calls for other nations to join’ (*Space News*, 18 April 2022) < <https://spacenews.com/u-s-declares-ban-on-anti-satellite-missile-tests-calls-for-other-nations-to-join/>>.

European Space Agency, ‘ESA Convention Booklets’ <[https://www.esa.int/About\\_Us/ESA\\_Publications/ESA\\_Convention\\_Booklets](https://www.esa.int/About_Us/ESA_Publications/ESA_Convention_Booklets)>.

FitzGerald, James, ‘Ukraine war: Elon Musk's SpaceX firm bars Kyiv from using Starlink tech for drone control’ (BBC News, 9 February 2023) < <https://www.bbc.com/news/world-europe-64579267>>.

Foust, Jeff, ‘Canada Joins U.S. in ASAT Testing Ban’ (Space News, 9 May 2022) < <https://spacenews.com/canada-joins-u-s-in-asat-testing-ban/>>.

Foye, Heather and Hernández, Gabriela Rosa, ‘UN First Committee Calls for ASAT Test Ban’ (Arms Control Association, December 2022) <<https://www.armscontrol.org/act/2022-12/news/un-first-committee-calls-asat-test-ban#:~:text=The%20United%20States%20launched%20its,of%20debris%20to%20litter%20space.>>>.

Government of Ireland, ‘National Space Strategy for Enterprise 2019-2025’ <<https://enterprise.gov.ie/en/publications/publication-files/national-space-strategy-for-enterprise-2019-2025.pdf>>.

Grand-Clément, Sarah, ‘Directed Energy Weapons: A New Look at an ‘Old’ Technology’ (UNIDIR) < <https://unidir.org/commentary/directed-energy-weapons-new-look-old-technology>>.

Harrison, Todd, 'International Perspectives on Space Weapons: A Report of the CSIS Aerospace Security Project' (Centre for Strategic & International Studies, May 2020) <[https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/200527\\_Harrison\\_IntlPerspectivesSpaceWeapons\\_WEB%20FINAL.pdf](https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/200527_Harrison_IntlPerspectivesSpaceWeapons_WEB%20FINAL.pdf)>.

Harwood, William, 'Blue Origin launches six passengers on supersonic flight to the edge of space' (4 August 2022) <<https://www.cbsnews.com/news/blue-origin-launches-six-passengers-on-supersonic-flight-to-the-edge-of-space/#:~:text=Bezos%2C%20his%20brother%20Mark%2C%20aviation,nine%20days%20after%20Branson%27s%20launch.>>>.

Hitchens, Theresa, 'EU embraces Biden administration's limited ASAT test ban as UN meeting looms' (Breaking Defense, 17 August 2023) <<https://breakingdefense.com/2023/08/eu-embraces-biden-administrations-limited-asat-test-ban-as-un-meeting-looms/>>.

HM Government, 'National Space Strategy' (September 2021) <[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1034313/national-space-strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1034313/national-space-strategy.pdf)>.

Hosang, JFR Boddens, 'Rules of Engagement and the International Law of Military Operations' (2020) (Oxford Scholarship Online) <<https://oxford-universitypressscholarship-com.jproxy.nuim.ie/view/10.1093/oso/9780198853886.001.0001/oso-9780198853886-chapter-2>>.

ICRC, 'A Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measure to Implement Article 36 of Additional Protocol I of 1977' (January 2006) <[https://www.icrc.org/en/doc/assets/files/other/icrc\\_002\\_0902.pdf](https://www.icrc.org/en/doc/assets/files/other/icrc_002_0902.pdf)>.

ICRC, 'Commentary of 1987 on Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, Article 35' <<https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=2F157A9C651F8B1DC12563CD0043256C>>.

ICRC, 'Conventional Weapons' <<https://casebook.icrc.org/glossary/conventional-weapons>>.

ICRC, 'Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight. Saint Petersburg, 29 November / 11 December 1868' <<https://ihl-databases.icrc.org/ihl/full/declaration1868>>.

ICRC, 'How Does Law Protect in War? Martens Clause' <[https://casebook.icrc.org/a\\_to\\_z/glossary/martens-clause#:~:text=The%20Martens%20Clause%2C%20understood%20today,part%2C%20by%20other%20IHL%20instruments](https://casebook.icrc.org/a_to_z/glossary/martens-clause#:~:text=The%20Martens%20Clause%2C%20understood%20today,part%2C%20by%20other%20IHL%20instruments)>.

ICRC, 'Treaty on the Prohibition of Nuclear Weapons' (18 January 2021) <<https://www.icrc.org/en/document/2017-treaty-prohibition-nuclear-weapons>>.

ICRC, 'Weapons' (30 November 2011) <<https://www.icrc.org/en/document/weapons>>.

Jones, Andrew, 'China, Russia enter MoU on international lunar research station' (Space News, 9 March 2021) <<https://spacenews.com/china-russia-enter-mou-on-international-lunar-research-station/>>.

Khubchandani, Mohit, 'As the First Country to Land on the Moon's South Pole, Should India Also be the First Space Power to Ratify the Moon Agreement?' (EJIL: Talk! 13 September 2023) <<https://www.ejiltalk.org/as-the-first-country-to-land-on-the-moons-south-pole-should-india-also-be-the-first-space-power-to-ratify-the-moon-agreement/>>.

Kim, Victoria, 'Elon Musk Acknowledges Withholding Satellite Service to Thwart Ukrainian Attack' (The New York Times, 8 September 2023) <<https://www.nytimes.com/2023/09/08/world/europe/elon-musk-starlink-ukraine.html>>.

King Matthew T. & Blank, Laurie R., 'International Law and Security in Outer Space: Now and Tomorrow' (2019) 113 American Journal of International Law Unbound <<https://www.cambridge.org/core/journals/american-journal-of-international-law/article/international-law-and-security-in-outer-space-now-and-tomorrow/2591D90C09C4A9375DE81F750DA98DDE>>.

Leahy, Pat, 'One small step as Ireland pledges not to make claims in outer space' (29 June 2022, The Irish Times) <<https://www.irishtimes.com/science/space/2022/06/29/tds-to-be-asked-to-vote-on-pledge-not-to-conquer-outer-space/>>.

Listner, Michael, 'Space Weapons: A Briefing with Recommendations for the Biden Administration' (Centre for Security Policy, May 2021) <[https://centerforsecuritypolicy.org/wp-content/uploads/2021/05/Listner\\_Space\\_Weapons\\_PDF\\_Optimize-1.pdf](https://centerforsecuritypolicy.org/wp-content/uploads/2021/05/Listner_Space_Weapons_PDF_Optimize-1.pdf)>.

Lockheed Martin, 'Next-Gen Threats Require Next-Gen Defenses' <<https://www.lockheedmartin.com/en-us/capabilities/directed-energy.html>>.

Machi, Vivienne, 'Six questions with France's Air and Space Force chief' (Defense News, 15 June 2023) <<https://www.defensenews.com/interviews/2023/06/15/six-questions-with-frances-air-and-space-force-chief/>>.

Mackenzie, Christian, 'French Air Force changes name as it looks to the stars' (Defense News, 15 September 2020) <<https://www.defensenews.com/global/europe/2020/09/15/french-air-force-changes-name-as-it-looks-to-the-stars/>>.

Mackintosh, Thomas, 'Virgin Galactic: First space tourism mission after decades of promises' (10 August 2023) <<https://www.bbc.com/news/science-environment-66468628>>.

McCallum, Shiona, 'US bans anti-satellite missile tests' (*BBC News*, 19 April 2022) <<https://www.bbc.com/news/technology-61151141>>.

Médecins Sans Frontiers, 'The Practical Guide to Humanitarian Law' <<https://guide-humanitarian-law.org/content/article/3/soft-law/>>.

Moore, Maia, 'African space agencies have the potential to lead the global space race' (Space News, 2 May 2023) <<https://spacenews.com/african-space-agencies-have-the-potential-to-lead-the-global-space-race/>>.

Morwood, James, *Pocket Oxford Latin Dictionary: Latin-English* (3<sup>rd</sup> edn., Oxford University Press 2012) <<https://www-oxfordreference-com.may.idm.oclc.org/display/10.1093/acref/9780191739583.001.0001/acref-9780191739583>>.

NASA History Division, 'SP-4012 NASA HISTORICAL DATA BOOK: VOLUME IV NASA RESOURCES 1969-1978' <<https://history.nasa.gov/SP-4012/vol4/ch1.htm#:~:text=NASA%27s%20annual%20budget%2C%20which%20had,considerable%20impact%20on%20the%20agency.>>>.

NASA, 'The Artemis Accords: Principles for a Peaceful, Safe and Prosperous Future' <[https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords\\_v7\\_print.pdf](https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords_v7_print.pdf)>.

Nasu, Hitoshi, ‘NATO Recognizes Space as an ‘Operational Domain’: One Small Step Towards a Rules-Based International Order in Outer Space’ (4 March 2020) Just Security <<https://www.justsecurity.org/68898/nato-recognizes-space-as-an-operational-domain-one-small-step-toward-a-rules-based-international-order-in-outer-space/>>.

NATO Secretary General Jens Stoltenberg, Press Conference following the meeting of the North Atlantic Council at the level of Foreign Ministers (Brussels 20 November 2019) <[https://www.nato.int/cps/en/natohq/opinions\\_171022.htm](https://www.nato.int/cps/en/natohq/opinions_171022.htm)>.

NATO, ‘NATO 2022 Strategic Concept’ (29 June 2022) <[https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept.pdf)>.

NATO, ‘NATO’s Approach to Space’ (23 May 2023) <[https://www.nato.int/cps/en/natohq/topics\\_175419.htm](https://www.nato.int/cps/en/natohq/topics_175419.htm)>.

NATO, ‘NATO’s overarching Space Policy’ (17 January 2022) <[https://www.nato.int/cps/en/natohq/official\\_texts\\_190862.htm](https://www.nato.int/cps/en/natohq/official_texts_190862.htm)>.

NATO, ‘The London Declaration: Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in London 3-4 December 2019’ (4 December 2019) Press Release 115 <[https://www.nato.int/cps/en/natohq/official\\_texts\\_171584.htm](https://www.nato.int/cps/en/natohq/official_texts_171584.htm)>.

Newman, Christopher, ‘India has landed on the Moon: here’s what the political and economic gains are’ (The Conversation, 30 August 2023) <<https://theconversation.com/india-has-landed-on-the-moon-heres-what-the-political-and-economic-gains-are-212313>>.

Organisation of the Prohibition of Chemical Weapons, ‘OPCW by the Numbers’ <<https://www.opcw.org/media-centre/opcw-numbers>>.

Parks Canada Directory of Federal Heritage Designations, 'Alouette 1 Satellite Programme National Historic Event' <  
[https://www.pc.gc.ca/apps/dfhd/page\\_nhs\\_eng.aspx?id=12060#:~:text=Alouette%201%20was%20launched%20on,design%20and%20build%20a%20satellite.>](https://www.pc.gc.ca/apps/dfhd/page_nhs_eng.aspx?id=12060#:~:text=Alouette%201%20was%20launched%20on,design%20and%20build%20a%20satellite.>).

Pictet, Jean S., 'Commentary on Geneva Convention II for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea' (ICRC, 1960) < [https://tile.loc.gov/storage-services/service/l1/l1mlp/GC\\_1949-II/GC\\_1949-II.pdf](https://tile.loc.gov/storage-services/service/l1/l1mlp/GC_1949-II/GC_1949-II.pdf) >.

Pope John Paul II, 'Message of His Holiness Pope John Paul II to the General Assembly of the United Nations' (Vatican, 7 June 1982) <[https://www.vatican.va/content/john-paul-ii/en/messages/pont\\_messages/1982/documents/hf\\_jp-ii\\_mes\\_19820607\\_disarmo-onu.html](https://www.vatican.va/content/john-paul-ii/en/messages/pont_messages/1982/documents/hf_jp-ii_mes_19820607_disarmo-onu.html)>.

Rajagopalan, Rajeswari Pillai, 'Managing New Actors in the Space Domain' (The Diplomat, 29 June 2019) < <https://thediplomat.com/2019/06/managing-new-actors-in-the-space-domain/> >.

Rousseau, Jean-Jacques, 'Discours sur l'Origine et les Fondements de l'Inégalité parmi les Hommes' (Collection complète des œuvres Geneve 1780-1789 1(4) online 7 octobre 2012) <<http://www.rousseauonline.ch/Text/discours-sur-l-origine-et-les-fondemens-de-l-inegalite-parmi-les-hommes.php> >.

Secretary General of the United Nations, Antonio Guterres, and the President of the ICRC, Peter Maurer, 'Explosive Weapons in Cities: Civilian devastation and suffering must stop' (ICRC, 18 September 2019) <<https://www.icrc.org/en/document/explosive-weapons-cities-civilian-devastation-and-suffering-must-stop> >.

Siegel, Julia, 'Commercial satellites are on the front lines of war today. Here's what this means for the future of warfare.' (30 August 2022, Atlantic Council) <<https://www.atlanticcouncil.org/content-series/airpower-after-ukraine/commercial-satellites-are-on-the-front-lines-of-war-today-heres-what-this-means-for-the-future-of-warfare/>>.

Steer, Cassandra, 'The Woomera Manual: Legitimising or Limiting Space Warfare?' in Nikki Coleman and Stephen Coleman (eds), *Military Space Ethics* (forthcoming 2021 Howgate Publishing) ANU College of Law Research Paper No 21.5, <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3802195](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3802195) >.

Stevens, Dale and De Zwart, Melissa, 'The Manual of International Law Applicable to Military Uses of Outer Space (MILAMOS)' (August 1, 2017). RUMLAE Research Paper No. 17-12, U. of Adelaide Law Research Paper No. 2020-46 <<https://ssrn.com/abstract=3065704> >.

The European Space Agency <<https://www.esa.int/> >.

The Oxford English Dictionary <<https://www-oed-com.may.idm.oclc.org/view/Entry/89280?redirectedFrom=humanity#eid> >.

The University of Adelaide, 'The Woomera Manual' <<https://law.adelaide.edu.au/woomera/> >.

The White House, 'Fact Sheet: Vice President Harris Advances National Security Norms in Space' (18 April 2022) <<https://www.whitehouse.gov/briefing-room/statements-releases/2022/04/18/fact-sheet-vice-president-harris-advances-national-security-norms-in-space/>>.

Thompson, Amy, 'SpaceX launches South Korea's 1<sup>st</sup> military satellite, nails rocket landing at sea' (20 July 2020) Space.com <<https://www.space.com/spacex-launches-south-korean-military-satellite-anasis-2-lands-rocket.html>>.

United Nations Office for Disarmament Affairs, 'Biological Weapons Convention' <<https://disarmament.unoda.org/biological-weapons/>>.

United Nations Office for Outer Space Affairs, 'About Us' <<https://www.unoosa.org/oosa/en/aboutus/index.html>>.

United States Space Force, 'About the Space Force' <<https://www.spaceforce.mil/>>.

Urrutia, Doris Ellin, 'India's Anti-Satellite Missile Test is a Big Deal. Here's Why.' (Space.com, 10 August 2022) <<https://www.space.com/india-anti-satellite-test-significance.html>>.

Wall, Mike, 'Bill Nye: It's Space Settlement, Not Colonisation' (Space.com, 25 October 2019) <<https://www.space.com/bill-nye-space-settlement-not-colonization.html>>.

Yang, Maya, 'Virgin Galactic successfully flies tourists to space for first time' (The Guardian, 10 August 2023) <<https://www.theguardian.com/science/2023/aug/10/vigin-galactic-space-flight-vss-unity-landing>>.

Zelenyi, Lev and Zakutnyaya, Olga, 'The 'simplest satellite' that opened up the universe: Sputnik 1 was launched 60 years ago to win a political space race, but its legacy is collaborative explorations far beyond Earth' (2017) 105(5) American Scientist <<https://www.americanscientist.org/article/the-simplest-satellite-that-opened-up-the-universe>>.