

# **Military Space Operations**

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(accepted for publication by T.M.C. Asser Press)

Exeter Centre for International Law

Working Paper Series

2020/2

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Cite as Kubo Mačák, "Military Space Operations", ECIL Working Paper 2020/2, forthcoming in Sergey Sayapin (ed.), *An Introduction to International Conflict and Security Law* (T.M.C. Asser Press 2020).

## Chapter

# Military Space Operations

Kubo Mačák\*

### Abstract

This chapter examines the international legal framework governing military space operations. In the chapter, ‘military space operations’ are understood as sequences of co-ordinated actions with a defined purpose, which are of a military character and have a material nexus to outer space. On the basis of this definition, the chapter then analyses issues raised by each of the principal bodies of international law that regulate military uses of outer space, starting with international space law, followed by the international law on the use of force and international humanitarian law. The chapter concludes by considering several overarching questions and the possible future development of the law in this area.

### Keywords

Armed conflict, international humanitarian law, military operations, outer space, satellites, space law, UN Charter, use of force

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## 1.1 Introduction

This chapter examines the international legal framework governing military space operations. Although States have been using space assets to further their security and military goals since the first satellite was launched in 1957, the main threshold moment in this area arguably came with the 1991 Gulf War. That conflict is sometimes called the First Space War because of the United States' extensive use of space capabilities in support of its military effort.<sup>1</sup> It was also a clarion call to other States, demonstrating vividly the unparalleled military potential offered by the space domain. Countries including Russia, China, India, France, and others have since made the development of effective space and counter-space capabilities a first-order military priority.

Several recent examples stand out to illustrate this trend. Perhaps most dramatically, a number of States now possess the capability to launch destructive earth-to-space attacks against satellites in orbit, with India being the latest member to join this growing club.<sup>2</sup> In addition, there have been reports of military satellites like the Russian *Luch* sidling close to other States' space assets in orbit, raising concerns that such manoeuvrable objects may be used to intercept communication or interfere with enemy satellites.<sup>3</sup> In response, France announced in 2019 that it would develop defensive space weapons, including so-called 'bodyguard' satellites, to protect its assets against such threats.<sup>4</sup>

All of these developments confirm the urgency of understanding the constraints that the law places on military uses of outer space. At present, there is no dedicated international legal regime for military space operations. Instead, the applicable law must be identified through the interpretation of the various relevant bodies of international law, which include international space law, the international law on the use of force, and international humanitarian law (IHL), against the backdrop of general international law.

To that end, two leading non-governmental initiatives—the McGill Manual on International Law Applicable to Military Uses of Outer Space (MILAMOS)<sup>5</sup> and the Woomera Manual on the International Law of Military Space Operations<sup>6</sup>—are presently underway. They share the aim of producing non-binding restatements of the relevant rules, following the tradition of expert manuals for, *inter alia*, the sea,<sup>7</sup> air,<sup>8</sup> and cyber domains.<sup>9</sup> To the extent of their acceptance by States, such projects help foster the international rule of law by providing the rigour, nuance, and granularity needed for the effective development and interpretation of the law.<sup>10</sup>

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<sup>1</sup> Anson and Cummings 1991.

<sup>2</sup> Jeffrey Gettleman and Hari Kumar, 'India Shot Down a Satellite, Modi Says, Shifting Balance of Power in Asia', *New York Times* (27 March 2019).

<sup>3</sup> Nathan Strout, 'Russian satellite creeps up to Intelsat satellite – again', C4ISRNET (3 September 2019).

<sup>4</sup> Florence Parly, 'Présentation de la stratégie spatiale de défense' (25 July 2019) <[https://www.defense.gouv.fr/salle-de-presse/discours/discours-de-florence-parly/discours-de-florence-parly\\_presentation-de-la-strategie-spatiale-de-defense](https://www.defense.gouv.fr/salle-de-presse/discours/discours-de-florence-parly/discours-de-florence-parly_presentation-de-la-strategie-spatiale-de-defense)>.

<sup>5</sup> Manual on International Law Applicable to Military Uses of Outer Space (MILAMOS) <<https://www.mcgill.ca/milamos/>>.

<sup>6</sup> The Woomera Manual <<https://law.adelaide.edu.au/woomera/>>. The author is a core expert.

<sup>7</sup> Doswald-Beck 1995 (hereinafter San Remo Manual).

<sup>8</sup> Humanitarian Policy and Conflict Research 2013 (hereinafter AMW Manual).

<sup>9</sup> Schmitt 2017 (hereinafter Tallinn Manual 2.0).

<sup>10</sup> See Stephens 2018, pp 96-99.

This chapter presents an introduction into these issues and an overview of the main contemporary controversies concerning the application of international law to military space operations. It begins by proposing a working definition of the eponymous term, to be used in the remainder of the chapter (section 1.2). It then dedicates a section to each of the principal bodies of law that regulate military uses of outer space, starting with international space law (section 1.3), followed by the international law on the use of force (section 1.4), and international humanitarian law (section 1.5). The chapter concludes by considering overarching issues and the possible future development of the relevant law (section 1.6).

## 1.2 Defining Military Space Operations

International law does not define the term ‘military space operations’. In fact, each of the words in this phrase presents its own ambiguities and interpretation problems. Firstly, the distinction between military and non-military uses of outer space is notoriously blurry. Already in 1961, it was observed that ‘[v]irtually every activity in space has a possible military connotation; military and non-military uses are extraordinarily interdependent.’<sup>11</sup> The nature of the actors or objects involved in a specific activity also does not conclusively determine the character of that activity. To wit, some of the ongoing peaceful exploration and scientific investigation of outer space is done by military personnel—while civilian contractors operate various space assets used for exclusively military purposes. Similarly, although objects launched into outer space are subject to registration requirements,<sup>12</sup> these duties do not include an obligation to indicate whether the object is intended to be used for military or non-military purposes.<sup>13</sup> Whether or not an activity in space is considered military in character must therefore be assessed on a case-by-case basis by assessing the function and purpose of the activity in question.

Secondly, international law does not draw a clear line between air space and outer space.<sup>14</sup> This is in contrast with several domestic jurisdictions including Australia, Denmark or Kazakhstan, which have set the boundary at the altitude of 100 km.<sup>15</sup> At the international level, this issue has occupied the UN Committee on the Peaceful Uses of Outer Space (COPUOS) for decades without it reaching a generally acceptable solution.<sup>16</sup> Therefore, all that can be said with some degree of certainty is that the threshold at which outer space begins is located *above* the highest altitude at which an airplane can fly, but *below* the lowest perigee of a satellite in orbit.<sup>17</sup> With technological advancements, these two points are getting closer, which is emphasized by the opponents of exact delimitation as a key reason why setting any specific figure would be artificial and arbitrary.<sup>18</sup> Rather than looking for a precise altitude, it is thus preferable to ask whether a given activity has a material

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<sup>11</sup> Lipson and Katzenbach 1961, p 806.

<sup>12</sup> See 1974 Convention on Registration of Objects Launched into Outer Space, 1023 UNTS 15 (hereinafter Registration Convention), Article II.

<sup>13</sup> But see text to note 125 below (suggesting that the registration of objects used exclusively for civilian purposes as such is a possible passive precaution under IHL).

<sup>14</sup> Lyall and Larsen 2017, p 153.

<sup>15</sup> Australia, Space Activities Act 1998, sect. 8; Denmark, Outer Space Act 2016, sect. 4(4); Law of the Republic of Kazakhstan on Space Activities 2012, sect. 1(6).

<sup>16</sup> See further UN COPUOS, Historical Summary on the Consideration of the Question on the Definition and Delimitation of Outer Space: Report of the Secretariat, UN Doc A/AC.105/769 (18 January 2002).

<sup>17</sup> See, e.g., AMW Manual, rule 1(a).

<sup>18</sup> See, e.g., U.S. Statement, Definition and Delimitation of Outer Space and the Character and Utilization of the Geostationary Orbit (2001) <<https://2009-2017.state.gov/s/1/22718.htm>>.

connection (nexus) with outer space as such, accepting that there may be borderline cases, which will remain difficult to categorize.

Thirdly, the term operations (or, more precisely, ‘military operations’) is known to IHL. As used in the IHL context, this term is generally understood to mean ‘the movements, manoeuvres and actions of any sort, carried out by the armed forces with a view to combat’.<sup>19</sup> In that sense, the term is narrower in its meaning than ‘hostilities’ conducted during an armed conflict (of which military operations form a part), but broader than ‘attacks’ (which constitute a particular aspect of military operations).<sup>20</sup> However, this interpretation is inappropriate outside of the IHL context (i.e., in the absence of an ongoing armed conflict), where one therefore has to fall back on a more general conceptualization. In this regard, a NATO-agreed definition of an ‘operation’ as a ‘sequence of coordinated actions with a defined purpose’ stands out for its technology- and domain-neutral wording.<sup>21</sup> For those reasons, it will also be relied on in the following text.

On the basis of the foregoing, a working definition can be drawn up for the purposes of this chapter. Military space operations are understood here as sequences of co-ordinated actions with a defined purpose, which are of a military character and which have a material nexus to outer space. This space nexus may take at least four main forms:<sup>22</sup> (1) military operations *in* space, such as on-orbit proximity operations;<sup>23</sup> (2) military operations *from* space, such as space-based ballistic missile defence interceptors;<sup>24</sup> (3) military operations *to* space, such as the launching of kinetic anti-satellite (ASAT) missiles;<sup>25</sup> and (4) military operations *through* space, such as the employment of long-range missiles that transit through outer space en route to their target.<sup>26</sup> The notion of material nexus to outer space also covers the use of space assets necessary to support or enable military activities on the Earth.

### 1.3 International Space Law

International space law is an area of public international law that regulates outer space and activities in and relating to outer space.<sup>27</sup> Its core is found in a framework Outer Space Treaty<sup>28</sup> and four additional treaties concerning, respectively, the rescue of astronauts and return of objects launched into space;<sup>29</sup> liability for damage caused by space objects;<sup>30</sup> registration of objects launched into

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<sup>19</sup> Sandoz et al 1987, para 152.

<sup>20</sup> ICRC, Third Expert Meeting on the Notion of Direct Participation in Hostilities Geneva, 23 – 25 October 2005 Summary Report <[https://www.icrc.org/eng/assets/files/other/direct\\_participation\\_in\\_hostilities\\_2005\\_eng.pdf](https://www.icrc.org/eng/assets/files/other/direct_participation_in_hostilities_2005_eng.pdf)> pp 18-19.

<sup>21</sup> NATO Standard AJP-3, Allied Joint Doctrine for the Conduct of Operations (February 2019), point 1.4.

<sup>22</sup> cf Blake 2014, pp 108-111 (adopting a similar classification in the context of space weapons).

<sup>23</sup> See, e.g., text to note 3 above.

<sup>24</sup> See, e.g., National Research Council 2012, pp 37-38.

<sup>25</sup> See, e.g., text to note 2 above.

<sup>26</sup> See, e.g., Shaw 1999, p 23 (noting that ‘the ICBM was the first weapon designed to travel into and through space’).

<sup>27</sup> See, e.g., Lyall and Larsen 2017, p 2.

<sup>28</sup> 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, 610 UNTS 205 (hereinafter Outer Space Treaty).

<sup>29</sup> 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched Into Outer Space, 672 UNTS 119 (hereinafter Rescue and Return Agreement).

<sup>30</sup> 1972 Convention on International Liability for Damage Caused by Space Objects, 961 UNTS 187.

space;<sup>31</sup> and State activities on the Moon and other celestial bodies.<sup>32</sup> In addition, over time, many rules of customary international law specifically applicable to outer space activities have crystallized, as well.<sup>33</sup>

Historically, international space law has evolved as a body of law almost exclusively focussed on peaceful use and exploration of outer space. This is confirmed by the preamble to the Outer Space Treaty, which notes that the adoption of the treaty reflected a shared desire on part of the States Parties ‘to contribute to broad international cooperation in the scientific as well as the legal aspects of the exploration and use of outer space for peaceful purposes’. Nevertheless, there are certain aspects of international space law which do relate to the conduct of military space operations.

### ***1.3.1 No General Prohibition of Military Space Operations***

At the outset, it is important to note that in spite of its focus on peaceful uses of outer space, international space law does not prohibit space activities that are military in character. In other words, the term ‘peaceful purposes’ used by the Outer Space Treaty should be understood as ‘non-aggressive’ or ‘non-hostile’, but not ‘non-military’.<sup>34</sup> That interpretation is supported by the binding provisions of that Treaty, including in particular Article III, which it is worth restating in full:

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, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding.

The express reference to the UN Charter, which codifies the core rules on the use of force, confirms that the drafters of the Outer Space Treaty did not intend to exclude the resort to military means in outer space altogether.<sup>35</sup> Instead, Article III mandates that any activity in or related to outer space must be carried on ‘in accordance with international law’, to include the said rules in the UN Charter.<sup>36</sup> Accordingly, States are permitted to engage in space operations while exercising their right to self-defence or while acting under the authorization of the UN Security Council—both of which are decidedly military but non-aggressive in character. States may also engage in other military space operations as long as these are not prohibited by other applicable rules of international law. This interpretation is in line with decades of consistent State practice, which has featured extensive and wide-ranging use of outer space for military purposes by all main space-faring nations.<sup>37</sup>

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<sup>31</sup> Registration Convention.

<sup>32</sup> 1979 Agreement governing the Activities of States on the Moon and Other Celestial Bodies, 1363 UNTS 3.

<sup>33</sup> Diederiks-Verschoor and Kopal 2008, pp 9-12.

<sup>34</sup> Similarly Meyer 1968, 27; Bridge 1980, p 658; Schmitt 2006a, p 101; Stephens and Steer 2015, p 74; Tronchetti 2015, p 339; contra Vlasic 1981, p 26.

<sup>35</sup> Tronchetti 2015, pp 338-340; see also Yearbook of the United Nations 1966, pp 39-40.

<sup>36</sup> Ramey 2000, p 127; Maogoto and Freeland 2007, p 1105; Schmitt 2006a, p 102.

<sup>37</sup> See, e.g., King and Blank 2019, pp 125-127.

### 1.3.2 *Specific Restrictions on Military Space Operations*

And yet, international space law does restrict and prohibit certain types of military space operations. The ‘focal point’ in this regard is Article IV of the Outer Space Treaty.<sup>38</sup> This provision establishes two separate sets of obligations for States, the first of which relates to placement of weapons of mass destruction (WMDs) in outer space and the other one to the military uses of the Moon and other celestial bodies.

Firstly, under Article IV(1), States are obliged not to place in orbit around the Earth objects carrying nuclear weapons or other types of WMDs, install such weapons on celestial bodies, or station such weapons in outer space in any other manner. The Outer Space Treaty does not expressly list specific types of WMDs to which the prohibition applies, but it is not controversial that the concept includes, besides nuclear weapons, also chemical and biological weapons.<sup>39</sup> By contrast, the prohibition does not cover conventional weapons, which means that States are not precluded from placing in orbit, for example, conventional anti-satellite weapons.<sup>40</sup>

It is worth addressing the exact legal meaning of the phrase ‘in orbit around the Earth’ in Article IV(1). Only weeks after the adoption of the Outer Space Treaty, it was revealed that the Soviet Union had been testing the so-called ‘Fractional Orbiting Bombardment System’, which would see nuclear weapons placed into an orbital trajectory but re-entering before completing an orbit in order to strike distant targets on the Earth’s surface.<sup>41</sup> The US official reaction was that the tests did not violate the Outer Space Treaty because the ‘space weapons would be fired “in a fractional orbit, *not a full orbit*”’.<sup>42</sup> On that basis, one can infer that the agreed interpretation between the two only space-faring nations at the time was that the Article IV(1) prohibition only covered objects that would circumnavigate the Earth at least one full time.<sup>43</sup> On that interpretation, the placement of WMDs in a fractional orbit is not prohibited by the Outer Space Treaty<sup>44</sup>—but it should be noted that this view is not universally accepted.<sup>45</sup>

Secondly, Article IV(2) mandates that the Moon and other celestial bodies are to be used exclusively for peaceful purposes. In addition, it specifically prohibits the establishment of military bases, installations and fortifications, the testing of weapons, and the conduct of military manoeuvres on celestial bodies. Unlike other provisions of the Outer Space Treaty, Article IV(2) only refers to ‘the Moon and other celestial bodies’, but not to outer space generally.<sup>46</sup> That means that the scope of Article IV(2) does not include the so-called ‘empty space’ between celestial

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<sup>38</sup> Schrogl and Neumann 2009, para 1.

<sup>39</sup> Strydom 2017, para 2; Schrogl and Neumann 2009, paras 24-25.

<sup>40</sup> Schrogl and Neumann 2009, para 27.

<sup>41</sup> Murrey Marder, ‘Orbital Bomb Rationalizing Jolts Officials’, *Washington Post* (5 November 1967), p A14.

<sup>42</sup> *Ibid* (emphasis added).

<sup>43</sup> See Ramey 2000, p 84 fn 355; see also Jasentuliyana and Lee 1979, p 14 (arguing that this interpretation reflects ‘the clear intention of the drafters’).

<sup>44</sup> See, e.g., U.S. Department of Defense, *Law of War Manual* (rev ed Dec 2016) (hereinafter *DoD Manual*), para 14.10.3.1.

<sup>45</sup> See, e.g., Schrogl and Neumann 2009, para 30 (arguing that ‘in orbit’ means ‘in a state of being or moving in an orbit’, which thus includes the placement of objects that follow only a section of a full orbit).

<sup>46</sup> See Outer Space Treaty, Articles I-III, V-VII, IX-XI, XIII (using the phrase ‘outer space, including the Moon and other celestial bodies’); see also *ibid*, Article V (using the phrase ‘activities in outer space and on celestial bodies’).



bodies.<sup>47</sup> Therefore, the proscriptions contained in this provision only apply to celestial bodies, including the Moon.

### 1.3.3 *Interaction between Space Law and Other Areas of International Law*

For issues that are not directly regulated by international space law, reference must be made to the other applicable areas of international law. Article III of the Outer Space Treaty, reproduced in full earlier, stipulates that all activities in outer space must be carried on in accordance with international law. In this way, the provision acts as a general incorporation clause, confirming that international law generally applies to human activities in outer space,<sup>48</sup> with the exception of those rules that are domain-specific, geographically constrained or otherwise incompatible with the space environment.<sup>49</sup> For the purposes of military space operations, the two main relevant areas are the law on the use of force and international humanitarian law, which are discussed in the following two sections.

At this junction, it is thus useful to consider the interplay between these different areas of international law, particularly in situations where rules of a different origin are in mutual tension or outright conflict.<sup>50</sup> It is sometimes suggested that one of these areas must in such cases always prevail over the others because it is supposedly more specifically tied to the relevant circumstances. Thus it has been said, for example, that due to the unique characteristics of the space environment, space law is ‘the *lex specialis*’, which prevails over other bodies of law in case of normative conflict;<sup>51</sup> but there is also the very different view that in the conduct of hostilities, IHL is ‘the *lex specialis*’, which prevails over other conflicting norms.<sup>52</sup>

It is submitted that neither of these views is compelling as it is imprecise and fallacious to label an entire area of law as ‘the *lex specialis*’. A better approach is to acknowledge that *lex specialis derogat legi generali* is an interpretive principle, which must be resorted to on a rule-by-rule basis.<sup>53</sup> In that sense, the principle entails that if two norms from different bodies deal with the same subject matter, priority should be given to that norm which is the more specific of the two,<sup>54</sup> in other words, ‘the one which has the larger common contact surface area with the situation’.<sup>55</sup> This is also the approach taken in the rest of this chapter.

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<sup>47</sup> See Yearbook of the United Nations 1966, p 39 (noting that during the drafting process of the Outer Space Treaty, a number of States ‘expressed regret that, according to the draft treaty, only the celestial bodies were to be used exclusively for peaceful purposes and that this requirement was not applicable generally to outer space’); see also Christol 1982, p 20; Schrogl and Neumann 2009, para 42.

<sup>48</sup> Lachs 1972, p 21; Hansen 2015, p 28.

<sup>49</sup> See, e.g., DoD Manual, para 14.10.2.2 (excluding rules that ‘apply only in certain geographical locations (such as a State’s own territory), and thus might not create obligations applicable to a State’s activities in outer space’).

<sup>50</sup> See further Stephens 2018.

<sup>51</sup> See, e.g., Freeland and Jakhu 2016, p 228.

<sup>52</sup> See, e.g., ILC, Draft Articles on the Effects of Armed Conflicts on Treaties, with Commentaries, Yearbook of the ILC, 2011, vol. II, Part Two, Article 2, commentary para 4.

<sup>53</sup> See Happold 2012, p 464; Stephens 2018, p 91.

<sup>54</sup> Koskenniemi 2006, para. 56.

<sup>55</sup> Sassòli and Olson 2008, p 604 (internal quotation marks and footnote omitted).

## 1.4 International Law on the Use of Force

The cornerstone of the international law on the use of force is found in Article 2(4) of the UN Charter, which provides for a general prohibition of the threat or use of force in international relations.<sup>56</sup> This prohibition must be considered in light of other relevant provisions of the UN Charter,<sup>57</sup> which include Article 51 (recognizing the inherent right of individual and collective self-defence in response to an armed attack) and Article 42 (providing a legal basis for military enforcement measures authorized by the UN Security Council). As noted earlier, Article III of the Outer Space Treaty expressly recognizes the applicability of the UN Charter to activities in space. It thus follows that Article 2(4) and other relevant rules in the Charter cover military space operations, as well.<sup>58</sup> As the ICJ held in *Nuclear Weapons*, these provisions ‘apply to any use of force, regardless of the weapons employed’.<sup>59</sup> Accordingly, any use of force employing space capabilities must also comply with the law on the use of force as codified in the UN Charter.

### 1.4.1 Use of Force

The applicable international legal regime is organized around the notion of ‘force’. Although non-forcible hostile measures in outer space may amount to violations of other rules of international law (for example, the prohibition of intervention), they do not trigger the application of the law on the use of force. Any response to such violations would also have to be non-forcible in nature, with the primary legal framework provided by the law of countermeasures.<sup>60</sup> It follows that the threshold between forcible and non-forcible measures is of paramount importance and it is thus essential to examine what constitutes a use of force in the space environment.

In that regard, the extreme situations are well understood. Thus, the use of destructive means against a space asset, such as firing a kinetic anti-satellite weapon against a satellite in orbit belonging to another State, clearly amounts to a use of force in the Charter sense. By contrast, hacking into an adversary’s satellite communication in order to clandestinely exfiltrate national security data without causing any damage or disruption to the satellite in question does not qualify as a use of force.

However, many other conceivable hostile acts in the space environment fall into the grey zone in the middle. In particular, it is unclear how to qualify acts that result in the temporary and/or reversible loss of functionality of a space object, such as optical sensor dazzling or radio frequency jamming. On the one hand, in 2008 China and Russia proposed a definition of the use of force, which would expressly include ‘any hostile actions against outer space objects’ aimed at ‘temporarily ... disrupting their normal functioning’.<sup>61</sup> On the other hand, the US rejected this

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<sup>56</sup> 1945 Charter of the United Nations, 1 UNTS XVI (hereinafter UN Charter), Article 2(4) (‘All Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations.’).

<sup>57</sup> See *Legality of the Threat or Use of Nuclear Weapons*, ICJ, Advisory Opinion of 8 July 1996 (hereinafter *Nuclear Weapons*), para. 38.

<sup>58</sup> Similarly Bridge 1980, p 659; Hansen 2015, p 48; Tronchetti 2015, p 350.

<sup>59</sup> *Nuclear Weapons*, para. 39.

<sup>60</sup> See UN General Assembly (2001) Draft Articles on Responsibility of States for Internationally Wrongful Acts with Commentaries, UN Doc. A/56/10 (hereinafter Articles on State Responsibility), Articles 22 and 49-54.

<sup>61</sup> Russia and China, Draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects, UN Doc. CD/1839 (29 February 2008), Article I(e).

definition as too broad given that it included not only activities ‘that result in permanent and irreversible damage, but *also hostile activities and actions that cause temporary and reversible effects*’.<sup>62</sup>

Since this exchange, China and Russia have abandoned the original extensive definition and replaced it with ‘any action intended to inflict damage on an outer space object under the jurisdiction and/or control of other States’,<sup>63</sup> which indicates a degree of convergence among the main space powers. To put the point at its lowest, it can probably be inferred that these States now consider at least some acts causing temporary or reversible loss of functionality of space objects—namely those that are not intended to inflict any damage—as falling below the threshold of force. But the exact criteria remain unsettled in the present state of the law.

### 1.4.2 *Threat to Use Force*

International law does not only prohibit actual uses of force by States, but also the threat to use force. The notions of ‘threat’ and ‘use’ of force are interrelated in the sense that if a given use of force is unlawful under international law, then the threat to use such force is also unlawful.<sup>64</sup> Therefore, an unprovoked express threat by one State to deploy a kinetic anti-satellite weapon against a space object of another State would constitute a prohibited threat to use force. By contrast, a statement that a State is ready to engage in an equivalent operation in the exercise of self-defence against an armed attack by another State would not in itself be unlawful.

The threat to use force does not need to be expressly pronounced to be covered by the prohibition. In the terrestrial environment, sudden massive build-up of troops on the border with a neighbouring State may amount to an implicit threat to use force against that State, in particular if the acting State has a history of resorting to such troop movements as a precursor to invasion.<sup>65</sup> Analogically, consider the example of a State that, in a short span of time, repeatedly engages in unconsented-to close-proximity orbital operations, thus putting the satellites belonging to its adversary within the reach of the former State’s on-board weapons. If the acting State has in the past followed up such operations with actual use of these weapons, its conduct could amount to an implicit threat to use force. By contrast, if the acting State does not have such a history, then the orbital manoeuvres would not automatically be considered as a threat of force.<sup>66</sup>

Although a threat need not be expressly stated, it must be communicated towards the potential victim State in some manner. In the example in the previous paragraph, that communication is implicit, but the conduct of the acting State leaves no doubt as to the target of its operations. By contrast, the mere acquisition of capabilities that can potentially be used to engage in the use of force does not constitute a threat.<sup>67</sup> Thus the mere placement of anti-satellite weapons in orbit

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<sup>62</sup> United States, Analysis of a Draft “Treaty on Prevention of the Placement of Weapons in Outer Space, or the Threat or Use of Force against Outer Space Objects”, UN Doc. CD/1847 (26 August 2008), para 5(i) (emphasis original).

<sup>63</sup> Russia and China, Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects, UN Doc. CD/1985 (12 June 2014), Article I(d).

<sup>64</sup> *Nuclear Weapons*, para. 47.

<sup>65</sup> See, e.g., UN Doc. S/PV.3438 (15 October 1994), p 11 (United Kingdom)

<sup>66</sup> Cf. ICJ, *Case Concerning Military and Paramilitary Activities in and Against Nicaragua (Merits)*, Judgment, [1986] ICJ Rep 14 (hereinafter *Nicaragua*), para 227 (holding that the mere existence of military manoeuvres near another State’s borders does not constitute a threat of force).

<sup>67</sup> Tallinn Manual 2.0, rule 70, commentary para 4.

unaccompanied by an either express or implied communication towards a specific third State does not qualify as a prohibited threat to use force against that State.<sup>68</sup> However, if the acting State issues an ultimatum to the third State that the weapons will be used against it unless certain demands are met, the former State will be in violation of Article 2(4).<sup>69</sup>

### 1.4.3 *Armed Attack and Self-Defence*

If the use of force against a victim State crosses the threshold of an armed attack, the said State is entitled to take forcible measures in the exercise of its right to self-defence.<sup>70</sup> In this regard, the US takes the otherwise exceptional position that any unlawful use of force automatically triggers the right to self-defence.<sup>71</sup> By contrast, the prevailing view in the international community corresponds to the ICJ ruling in *Nicaragua* that only ‘the most grave forms of the use of force’ constitute an armed attack.<sup>72</sup> However, the distinction between the most grave forms and other less grave forms of the use of force is difficult to make in practice and especially so in the space environment due to the virtual absence of relevant State practice.

To that end, the ICJ jurisprudence assesses the scale and effects of an operation in order to determine whether it should be classified as an armed attack.<sup>73</sup> On that approach, an isolated incident of permanently disabling another State’s satellite used exclusively for commercial purposes would likely fall short of the threshold. Conversely, a large-scale operation aimed simultaneously at a constellation of an adversary’s missile warning satellites would certainly constitute an armed attack. Situations falling between these two extremes are harder to classify, with the resulting grey zone demonstrating further the need to develop and clarify the law in this area.

Any measures taken by the victim State in the exercise of its right to self-defence must comply with the customary principles of necessity and proportionality.<sup>74</sup> In that respect, the principle of necessity requires that the use of force in self-defence is the only way to successfully repel an armed attack against the victim State; if lesser non-forcible means are available, then that State must use those means instead.<sup>75</sup> Consider, for instance, a massive cyber operation by State A aimed at assuming control over a constellation of State B’s military remote sensing satellites and then destroying their sensors by pointing them towards the Sun. If successful, the large scale and destructive effects of the operation would justify its qualification as an armed attack. However, if State B has at its disposal non-forcible means to thwart the hostile operation (such as rapid cyber

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<sup>68</sup> But see Maogoto and Freeland 2007, p 1111 (‘mere deployment of [anti-satellite] weaponry can amount to the threat of the use of force, particularly where space weaponry is hoisted to the same orbital plane as another state’s space assets’).

<sup>69</sup> Cf. Tallinn Manual 2.0, rule 70, commentary para 4.

<sup>70</sup> UN Charter, Article 51.

<sup>71</sup> See, e.g., DoD Manual, para 1.11.5.2.

<sup>72</sup> *Nicaragua*, para 191.

<sup>73</sup> *Ibid*, para 195; see also, e.g., ICJ, *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*, Advisory Opinion, [2004] ICJ Rep 136, Separate Opinion of Judge Higgins, para 33; ICJ, *Armed Activities on the Territory of the Congo (Democratic Republic of the Congo v. Uganda)*, Judgment, [2005] ICJ Rep 168 (hereinafter *Armed Activities*), Separate Opinion of Judge Kooijmans, para 29.

<sup>74</sup> *Nicaragua*, para 176; *Nuclear Weapons*, para. 41; ICJ, *Oil Platforms (Islamic Republic of Iran v. United States of America)*, Judgment, [2003] ICJ Rep 161 (hereinafter *Oil Platforms*), para 76; *Armed Activities*, para 147.

<sup>75</sup> Cf. *Oil Platforms*, para 73 (‘the requirement of international law that measures taken avowedly in self-defence must have been necessary for that purpose is strict and objective, leaving no room for any “measure of discretion”’).

countermeasures or the ability to jam all communications with its own satellites), it would be obliged to make a reasonable attempt to resort to those alternative means before taking forcible measures against State A.<sup>76</sup>

Any use of force in self-defence must also be consistent with the principle of proportionality. Importantly, this principle does not require symmetry between the mode of initial attack and the mode of response; rather, the response must be limited to the minimum needed to repel the attack.<sup>77</sup> In the example above, if non-forcible measures proved ineffectual against the attack, State B would be permitted to engage in an amount of force proportionate to the gravity of the attack, but no more.<sup>78</sup> It would thus be within its rights to apply a targeted strike against a command centre on State A's territory whence the hostile cyber operations are executed. By contrast, assuming that the strike was successful and State A has ceased all hostile activity, it would be disproportionate for State B to then launch a ground invasion of State A with the aim to retaliate and deter future attacks.<sup>79</sup>

## 1.5 International Humanitarian Law

International humanitarian law (IHL), also known as the law of armed conflict, is the area of public international law that governs the conduct of belligerents during an armed conflict.<sup>80</sup> With respect to military space operations, a number of scholars have questioned the extent to which the rules of IHL apply in outer space.<sup>81</sup> In fact, for a long time, the possibility of hostilities reaching outer space had been seen as both inconceivable and too impractical to be seriously considered in the development of the law. For example, in the early years of space exploration, India argued that military aspects of terrestrial international law should be totally inapplicable to outer space, which should remain 'a kind of warless world'.<sup>82</sup> And during the drafting of the Additional Protocols to the Geneva Conventions over a decade later, the rapporteur of a working group on methods and means of warfare and the protection of the civilian population expressly said that 'the Working Group had at no time considered the effects of hostilities taking place in outer space'.<sup>83</sup>

Still, the continuing militarization of outer space and the increasing reliance on space assets by all major military powers in the 21<sup>st</sup> century underline the urgency of clarifying the applicability of IHL in outer space. It is the position of this author that the scope of application of this body of law is not limited to the terrestrial environment.<sup>84</sup> This view is justified by reasons arising both from international space law and from IHL itself. As far as space law is concerned, as noted earlier, Article III of the Outer Space Treaty operates as a general incorporation clause, which thus

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<sup>76</sup> Cf. Tallinn Manual 2.0, rule 72, commentary para 3.

<sup>77</sup> ILC, Addendum: Eighth Report on State Responsibility by Mr. Roberto Ago, Special Rapporteur, UN Doc. A/CN.4/318/Add.5-7, para 121; *Nuclear Weapons*, Dissenting Opinion of Judge Higgins, para. 5.

<sup>78</sup> Cf. *Oil Platforms*, para 77 (noting that the destruction of several naval vessels and aircraft by the US was disproportionate to the mining of a single US warship).

<sup>79</sup> Cf. Nolte and Randelzhofer 2012, para 57 (noting that lawful self-defence 'must not acquire a retaliatory, deterrent, or punitive character').

<sup>80</sup> See, e.g., Sassòli 2019, para 1.01.

<sup>81</sup> See, e.g., Vermeer 2007, p 74; Freeland 2015, p 102; Boothby 2014, p 224.

<sup>82</sup> UN Doc. A/AC.105/PV.3 (7 May 1962), p 63 (India).

<sup>83</sup> CDDH/III/SR.11, p 86, para 9 (Baxter).

<sup>84</sup> See further Mačák 2018.

confirms the general applicability of international law to activities in outer space.<sup>85</sup> Because IHL is a constituent part of international law, Article III thus also incorporates the rules of this body of law: *a maiori ad minus*.<sup>86</sup>

The same interpretive outcome also follows from the fundamental tenets of IHL itself. Specifically, States have a general obligation to respect and ensure respect for IHL ‘in all circumstances’, codified in Common Article 1 to the Geneva Conventions<sup>87</sup> and considered to reflect customary international law.<sup>88</sup> The phrase ‘in all circumstances’ is comprehensive and therefore extends to any location where an armed conflict may occur, including outer space.<sup>89</sup> It can thus be concluded that IHL applies to military space operations in general; the major difficulties lie in the specific challenges that the space environment poses for IHL rules that have been developed in the terrestrial environment.

Accordingly, the remainder of this section examines *how* IHL governs military space operations. To that end, it specifically considers three fundamental rules on the conduct of hostilities: distinction, proportionality, and precautions. These rules were codified in Additional Protocol I and they are generally considered to reflect customary international law applicable in both international and non-international armed conflicts.<sup>90</sup> As such, they apply to all States, irrespective of whether they have ratified the Protocol, or not.

### 1.5.1 *Distinction*

The rule on distinction requires the belligerents to distinguish at all times between the civilian population and combatants and between civilian objects and military objectives.<sup>91</sup> With respect to persons, IHL thus forbids the lethal targeting of civilians unless they directly participate in hostilities.<sup>92</sup> Conversely, members of the armed forces (with the exception of medical and religious personnel) qualify as combatants and they may therefore be attacked during an armed conflict<sup>93</sup> unless they are *hors de combat*.<sup>94</sup> Although this rule is fairly uncontroversial in the terrestrial environment, it poses a specific problem with respect to military astronauts.

Unlike IHL, space law does not distinguish between civilian and military personnel. Instead, it designates all personnel of crewed spacecraft as ‘envoys of mankind’ who are subject to specific protections, which include the duty of all States to render them ‘all possible assistance’ in time of

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<sup>85</sup> See text to note 48 above.

<sup>86</sup> Similarly Stephens and Steer 2015, p 11.

<sup>87</sup> See also 1977 Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts, 1125 UNTS 3 (hereinafter AP I), preamble (reaffirming that the provisions of the Conventions and of the Protocol ‘must be fully applied in all circumstances’) and Article 1(1) (extending the obligation to respect and to ensure respect for IHL in all circumstances to the provisions of the Protocol).

<sup>88</sup> Henckaerts and Doswald-Beck 2005 (hereafter ICRC Customary IHL Study), Volume I, rule 139; *Nicaragua*, para 220.

<sup>89</sup> Maćák 2018, pp 15 and 21; see also Hathaway 2017, p 576 (interpreting the phrase as meaning that the obligations to which it applies ‘do not have a geographic or temporal threshold’).

<sup>90</sup> See ICRC Customary IHL Study, Volume I, in particular rules 1, 7, 14, 15, and 22.

<sup>91</sup> AP I, Article 48.

<sup>92</sup> AP I, Article 51(3).

<sup>93</sup> AP I, Article 43.

<sup>94</sup> AP I, Article 41(1); see also AP I, Article 41(2) (defining persons *hors de combat* as those who are in the power of the adversary; those who clearly express an intention to surrender; and those who are unconscious or otherwise incapacitated, and thus incapable of defending themselves).

need.<sup>95</sup> In this regard, space law and IHL thus seem to be at loggerheads. Supposing that there is an international armed conflict between States A and B, how can a military astronaut of State A qualify as a lawful target and, at the same time, be entitled to all possible assistance from State B?

It is proposed that this normative tension is best resolved through reference to the respective aims of the two applicable bodies of law. While space law protections for astronauts as envoys of mankind are predicated on the general goal of this body of law to facilitate peaceful uses and exploration of outer space, the category of combatants under IHL was designed to cover those persons who materially contribute to the efforts of the belligerents to prosecute an existing armed conflict.<sup>96</sup> Accordingly, military astronauts should maintain their space law status and protections unless and until they engage in conduct with a material nexus to an armed conflict, at which point they become targetable in accordance with the rules of IHL.<sup>97</sup>

As far as objects are concerned, belligerents may direct their attacks only against military objectives, which are defined as those objects that through their nature, purpose, use or location make an effective contribution to the enemy's military action and whose destruction, capture or neutralization offers a definite military advantage.<sup>98</sup> A key issue relates to the interpretation of the term 'military action' in this definition. In this regard, two main views have emerged in international practice and academic writings.

According to the broad view, all objects that make a contribution to the war-sustaining capability of the enemy qualify as military objectives. Importantly, this includes economic targets or, in other words, objects that are of economic importance to the adversary, because the revenues from those targets may be used to sustain the enemy's war-fighting effort. This view has been endorsed by various actors including the US<sup>99</sup> and Ecuador,<sup>100</sup> the Ethiopia-Eritrea Claims Commission,<sup>101</sup> and several scholars.<sup>102</sup> As one of the proponents of this view admits, in outer space this means that due to their economic importance, 'satellites and their architecture can be perceived as legitimate military targets and become the object of attacks'.<sup>103</sup>

It is submitted that this admission in fact convincingly illustrates the excessively far-reaching nature of the broad view. An interpretation according to which any satellite providing commercial profits to the enemy would be targetable is too permissive and should be rejected, because it would render virtually meaningless the protection of civilian objects in outer space.<sup>104</sup> Instead, the notion of military action should be interpreted more narrowly to mean that objects are targetable only if they have a proximate nexus to the war-fighting capability of the enemy.<sup>105</sup> This is also the view

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<sup>95</sup> Outer Space Treaty, Article V(1); see also Rescue and Return Agreement, Article 2.

<sup>96</sup> Mačák 2018, p 30.

<sup>97</sup> *Ibid*, p 31.

<sup>98</sup> AP I, Article 52(2).

<sup>99</sup> DoD Manual, para 5.6.6.2.

<sup>100</sup> Ecuador, Naval Manual 1989, para 8.1.1, cited in ICRC Customary IHL Study, Volume II(1), p 183.

<sup>101</sup> Eritrea-Ethiopia Claims Commission, Partial Award, Western Front, Aerial Bombardment and Related Claims, Eritrea's Claims 1, 3, 5, 9-13, 14, 21, 25 and 26 (2005) 26 RIAA 291, para 121.

<sup>102</sup> See, e.g., Bourbonnière 2004; Watkin 2014; Goodman 2016.

<sup>103</sup> Bourbonnière 2004, p 61.

<sup>104</sup> Cf. Stephens and Steer 2015, pp 92-93.

<sup>105</sup> Dinstein 2016, p 109.

taken by most States,<sup>106</sup> expert manuals,<sup>107</sup> and many scholars.<sup>108</sup> On this interpretation, military imaging and reconnaissance satellites could qualify as military objectives, whereas purely commercial satellites normally would not.

### ***1.5.2 Proportionality***

Even if an object qualifies as a military objective, it may still only be targeted if doing so is consistent with the proportionality rule. This rule requires that attacking the object must not be expected to cause incidental civilian harm that would be excessive in relation to the concrete and direct military advantage anticipated.<sup>109</sup> Interpreting this rule in the outer space context poses particular difficulties given that the vast majority of space assets are so-called ‘dual-use’ objects, which means that they are being simultaneously used for both civilian and military purposes. When such objects are attacked, incidental harm is ‘inevitable, and often considerable’.<sup>110</sup>

Consider, for example, a commercial communications satellite that carries a total of 24 individual transponders, one of which is used for military communications by State A’s armed forces and the remaining ones are used to provide broadband services to civilian schools, hospitals, and disaster relief agencies in the same State. If an international armed conflict were to break out between States A and B, the satellite would qualify as a military objective because it is being presently used for military purposes.<sup>111</sup> However, before attacking this satellite, State B would have to weigh the anticipated military advantage against the expected incidental harm. In that sense, the loss of connectivity for schools might amount to little more than inconvenience, which does not factor in the proportionality calculus.<sup>112</sup> Conversely, the consequences could be significantly graver for hospitals and the disruption to disaster relief could foreseeably cause a considerable loss of civilian life. If that was the case and, at the same time, the anticipated military advantage was minimal—for instance because State A’s military communications are known to be very resilient and would reasonably be expected to be rerouted very quickly after the satellite was destroyed—the expected incidental harm would be excessive relative to that military advantage. Accordingly, the attack against the satellite would be prohibited by IHL.

A final issue to consider with respect to proportionality is the question of space debris. In that respect, kinetic attacks against objects in Earth orbit are particularly problematic due to the near certainty that they will generate significant amounts of persistent debris. For example, the 2007 Chinese anti-satellite test against a defunct weather satellite created more than 3,000 pieces of debris, many of which will remain in orbit for decades and thus pose danger to other space assets in low Earth orbit.<sup>113</sup> Even the 2019 Indian anti-satellite test, which according to India was

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<sup>106</sup> Crawford 2017, p 60 fn 49.

<sup>107</sup> San Remo Manual, para 60.11; AMW Manual, rule 24, commentary para 2; Tallinn Manual 2.0, rule 100, commentary para 19.

<sup>108</sup> See, e.g., Schmitt 2006b, p 281; Oeter 2013, p 113; Jachec-Neale 2014, pp 108-109 and 254; Dinstein 2016, p 109; Boothby 2019, p 177.

<sup>109</sup> AP I, Articles 51(5)(b) and 57(2)(a)(iii).

<sup>110</sup> Oeter 2013, p 197.

<sup>111</sup> AP I, Article 52(2).

<sup>112</sup> AMW Manual, rule 1(l), commentary para 5; Tallinn Manual 2.0, rule 113, commentary para 5.

<sup>113</sup> Weeden 2012, p 1.



specifically designed ‘to ensure that there is no space debris’,<sup>114</sup> still reportedly created at least 400 pieces of debris, a few of which were thrown into orbits with high apogees, resulting in an increased impact risk to the International Space Station.<sup>115</sup>

The question of law with respect to kinetic attacks in outer space is to what extent the debris-creation risk should be factored into the proportionality analysis. The rule on proportionality requires that all reasonably foreseeable incidental harm be taken into account by those who plan or decide upon an attack.<sup>116</sup> The ICRC has interpreted this to mean that commanders must also take into account the foreseeable reverberating effects of an attack.<sup>117</sup> However, the exact impact of an orbital collision cannot be fully foreseen and can only be expressed in probabilistic terms. There are some instances of State practice suggesting that in undertaking a proportionality evaluation, belligerents ‘should consider the *risks* of unintended or cascading effects on civilians and civilian objects’.<sup>118</sup> Nevertheless, the exact level of probability required for the resulting incidental harm to be considered as ‘expected’ in the sense of the proportionality rule remains controversial.<sup>119</sup>

### 1.5.3 Precautions

Happily, the difficulties identified in the preceding section are at least to some extent alleviated by the rules on precautions in attacks (also known as active precautions). Central among them is the requirement that in the conduct of military operations, belligerents must take constant care to spare the civilian population, civilians and civilian objects.<sup>120</sup> To that end, military commanders must take all feasible precautions to avoid, and in any event to minimize, incidental civilian harm caused by any attack they plan or decide upon.<sup>121</sup> In situations where a non-debris producing alternative (e.g. a cyber operation, signal jamming, or blinding by lasers) is available for the purposes of neutralizing a military objective in outer space, the military commander is thus under an obligation to utilize that alternative in order to keep any incidental harm to a minimum.<sup>122</sup> This way, the commander can achieve the same military effect while avoiding the creation of debris implicit in any act of physical destruction in outer space.

Finally, IHL complements the rules on active precautions with those prescribing passive precautions. Specifically, the parties to armed conflicts must, to the maximum extent feasible,

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<sup>114</sup> India, Ministry of External Affairs, ‘Frequently Asked Questions on Mission Shakti’ (27 March 2019) <[https://www.mea.gov.in/press-releases.htm?dtl/31179/Frequently\\_Asked\\_Questions\\_on\\_Mission\\_Shakti\\_Indias\\_AntiSatellite\\_Missile\\_test\\_conducted\\_on\\_27\\_March\\_2019](https://www.mea.gov.in/press-releases.htm?dtl/31179/Frequently_Asked_Questions_on_Mission_Shakti_Indias_AntiSatellite_Missile_test_conducted_on_27_March_2019)>.

<sup>115</sup> Jeff Foust, ‘NASA Warns Indian Anti-Satellite Test Increased Debris Risk to ISS’ Space News (2 April 2019) <<https://spacenews.com/nasa-warns-indian-anti-satellite-test-increased-debris-risk-to-iss/>>.

<sup>116</sup> AP I, Article 57(2)(a)(iii); ICTY, *Prosecutor v Galić*, Judgement (Trial Chamber), 5 December 2003, Case No. IT-98-29-T, para 58.

<sup>117</sup> ICRC 2015, pp 42, 52.

<sup>118</sup> Guymon 2014, p 737.

<sup>119</sup> Compare AMW Manual, rule 14, commentary para 6 (arguing that ‘expected’ means that the ‘outcome is probable, i.e. more likely than not’) with Robinson and Nohle 2016, p 118 (arguing that ‘expected’ means that the outcome ‘is likely to occur rather than more likely than not’).

<sup>120</sup> AP I, Article 57(1); ICRC Customary IHL Study, Volume I, rule 15, first sentence.

<sup>121</sup> AP I, Article 57(2)(a)(ii); ICRC Customary IHL Study, Volume I, rule 15, second sentence.

<sup>122</sup> Hansen 2015, pp 58-59; Stephens and Steer 2015, p 29.

protect civilians and civilian objects against the dangers resulting from military operations.<sup>123</sup> As noted earlier, much of the dangers that military space operations pose for civilians result from the dual-use character of many space assets. Insofar as doing so is practicable and practically possible, States should thus separate military from civilian uses of the space objects that they operate.<sup>124</sup> In situations where such separation is not feasible, they should in any event aim to improve the resilience of those aspects of dual-use space objects that are used for civilian purposes. Conversely, if a given satellite is exclusively dedicated to civilian purposes (e.g. water conservation and agriculture), it would also be consistent with these obligations for the launching State to mark and register it as such, thus indicating its protected status to any potential attacker.<sup>125</sup>

## 1.6 Conclusion

With the increasing use of outer space for military purposes, understanding the international legal framework applicable to military space operations is becoming ever more important. Thus far, this body of law has not been codified in an easily accessible single source. However, as demonstrated throughout this chapter, that does not mean that military activities in outer space escape legal regulation altogether. Conversely, such activities are subject to a multitude of legal constraints established principally by international space law, international law on the use of force, and international humanitarian law.

Very few of the relevant rules of these areas of international law expressly consider military space operations as understood in this chapter. As we have seen, the cornerstone treaties of the law on the use of force and IHL were drawn up at a time when military activities in space were either science-fiction or, at best, still in their infancy. Moreover, space law treaties predominantly concentrate on the peaceful exploration and use of outer space and their coverage of military aspects is minimal. Therefore, much of the analysis presented in this chapter has focussed on the interpretation of rules developed for the terrestrial environment and their extrapolation into the space domain.

In doing so, the chapter has identified a number of areas where the law is either underdeveloped or unclear. For example, opinions differ as to whether the prohibition to place objects carrying WMDs ‘in orbit around the Earth’ covers such objects if they are only placed into a partial orbital trajectory.<sup>126</sup> Similarly, it remains unclear under what conditions does causing temporary or reversible loss of functionality of space objects qualify as a use of force.<sup>127</sup> And the debate around war-sustaining objects poses specific problems for the application on the rule of distinction in outer space.<sup>128</sup>

All of these examples underline the need for further clarity in this area. To that end, States should be encouraged to develop legal positions on these and related matters. Comprehensive expert manuals like those that will be produced in the scope of the MILAMOS and Woomera

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<sup>123</sup> AP I, Article 58(c); ICRC Customary IHL Study, Volume I, rule 22.

<sup>124</sup> Cf. ICRC Customary IHL Study, Volume I, pp 70-71.

<sup>125</sup> Cf. DoD Manual, para 5.14.4 (considering that the use of distinctive and visible signs to identify protected objects as such is a possible passive precaution).

<sup>126</sup> Sect. 1.3.2 above.

<sup>127</sup> Sect. 1.4.1 above.

<sup>128</sup> Sect. 1.5.1 above.

projects can certainly help by providing interpretations tested through inclusive deliberative processes. However, in the final analysis, States still are the primary legislators of the international legal system. It is thus the action that they take, including in response to the non-State-driven initiatives, that will shape the future legal landscape applicable to military space operations.

## References

- Anson P and Cummings D (1991) The First Space War: The Contribution of Satellites to the Gulf War, *The RUSI Journal* 136:45-53
- Blake D (2014) Military Strategic Use of Outer Space. In Nasu H and McLaughlin R (eds), *New Technologies and the Law of Armed Conflict*, T.M.C. Asser Press, The Hague, pp 97-114
- Boothby B (2019) Aspects of the Distinction Principle under the US DoD Law of War Manual. In Newton MN (ed) *The United States Department of Defense Law of War Manual: Commentary and Critique*, Cambridge University Press, Cambridge, pp 161-200
- Bourbonnière M (2004) Law of Armed Conflict (LOAC) and the Neutralisation of Satellites or *Ius in Bello Satellitis*, *Journal of Conflict and Security Law* 9:43-69
- Bridge RL (1980) International Law and Military Activities in Outer Space, *Akron Law Review* 13:649-664
- Christol CQ (1982) *Modern International Law of Outer Space*, Pergamon Press, New York
- Crawford E (2017) The Principle of Distinction and Remote Warfare. In Ohlin J (ed) *Research Handbook on Remote Warfare*, Edward Elgar, Cheltenham, pp 50-78
- Diederiks-Verschoor IPP and Kopal V (2008) *An Introduction to Space Law*, 3rd rev edn, Kluwer Law International, The Hague
- Dinstein Y (2016) *The Conduct of Hostilities under the Law of International Armed Conflict*, 3rd edn, Cambridge University Press, Cambridge
- Doswald-Beck L (ed) (1995) *San Remo Manual on International Law Applicable to Armed Conflicts at Sea*. Cambridge University Press, Cambridge
- Freeland S and Jakhu RS (2016) The Intersection Between Space Law and International Human Rights Law. In Jakhu RS and Dempsey PS (eds), *Routledge Handbook of Space Law*, Routledge, pp 225-238
- Goodman R (2016) The Obama Administration and Targeting “War-Sustaining” Objects in Noninternational Armed Conflict, *American Journal of International Law* 110:663-679
- Guymon CD (ed) (2014) *Digest of United States Practice in International Law*, Office of the Legal Adviser, United States Department of State, Washington DC
- Hansen R (2015) The Role of the Air-Space Boundary in Regulating Military Use of Outer Space, *Annals of Air and Space Law* 40:25-70
- Happold M (2012) International Humanitarian Law and Human Rights Law. In Henderson C and White N (eds), *Research Handbook on International Conflict and Security Law*, Edward Elgar, Cheltenham, pp 444-466
- Hathaway OA et al (2017) Ensuring Responsibility: Common Article 1 and State Responsibility for Non-State Actors, *Texas Law Review* 95:539-590
- Henckaerts JM and Doswald-Beck L (2005) *Customary International Humanitarian Law*, Volumes I, II(1), and II(2), Cambridge University Press, Cambridge

- Humanitarian Policy and Conflict Research (2013) *Manual on International Law Applicable to Air and Missile Warfare*. Cambridge University Press, Cambridge
- ICRC (2015) *International Humanitarian Law and the Challenges of Contemporary Armed Conflicts* (Report Prepared for the 32nd International Conference of the Red Cross and Red Crescent), ICRC, Geneva
- Jachec-Neale A (2014) *The Concept of Military Objectives in International Law and Targeting Practice*, Routledge, Abingdon
- Jasentuliyana N and Lee RS (1979) *Manual on Space Law, Volume I*, Oceana Publications, Dobbs Ferry
- King MT and Blank LR (2019) *International Law and Security in Outer Space: Now and Tomorrow*, *AJIL Unbound* 113:125-129
- Koskenniemi M (2006) *Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law – Report of the Study Group of the International Law Commission*, UN Doc A/CN.4/L.682
- Lachs M (1972) *The Law of Outer Space*, Martinus Nijhoff, Leiden
- Lipson L and Katzenbach N (1961) *The Law of Outer Space*. In *Legal Problems of Space Exploration: A Symposium*, Library of Congress, Washington DC
- Lyll F and Larsen PB (2017) *Space Law: A Treatise*, 2nd edn, Routledge, Abingdon
- Mačák K (2018) *Silent War: Applicability of the *Jus in Bello* to Military Space Operations*, *International Law Studies* 94:1-38
- Maogoto JN and Freeland S (2007) *Space Weaponization and the United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?*, *The International Lawyer* 41:1091-1119
- Meyer A (1968) *Interpretation of the Term ‘Peaceful’ in the Light of the Space Treaty*, *Proceedings, Colloquium on Law of Outer Space* 11:24-29
- National Research Council (2012) *Making Sense of Ballistic Missile Defense: An Assessment of Concepts and Systems for U.S. Boost-Phase Missile Defense in Comparison to Other Alternatives*, National Academies Press, Washington DC
- Nolte G and Randelzhofer A (2012) *Article 51*. In Simma B et al (eds), *The Charter of the United Nations: A Commentary*, 3rd edn, Volume II, Oxford University Press, Oxford, pp 1397-1428
- Oeter S (2013) *Methods and Means of Combat*. In Fleck D (ed) *The Handbook of International Humanitarian Law*, 3rd edn, Oxford University Press, Oxford
- Ramey R (2000) *Armed Conflict on the Final Frontier: The Law of War in Space*, *Air Force Law Review* 48:1-157
- Robinson I and Nohle E (2016) *Proportionality and Precautions in Attack: The Reverberating Effects of Using Explosive Weapons in Populated Areas*, *International Review of the Red Cross* 98:107-145
- Sandoz Y, Swinarski C and Zimmerman B (eds) (1987) *Commentary on the Additional Protocols of 8 June 1977 to the Geneva Conventions of 12 August 1949*, ICRC, Geneva

- Sassòli M (2019) *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare*, Edward Elgar, Cheltenham
- Sassòli M and Olson LM (2008) The Relationship Between International Humanitarian and Human Rights Law Where It Matters: Admissible Killing and Internment of Fighters in Non-International Armed Conflicts, *International Review of the Red Cross* 90:599-627
- Schmitt MN (2006a) International Law and Military Operations in Space, *Max Planck Yearbook of United Nations Law* 10:89-125
- Schmitt MN (2006b) Fault Lines in the Law of Attack. In Breau S and Jachee-Neale A (eds), *Testing the Boundaries of International Humanitarian Law*, BIICL, London, pp 277-307
- Schmitt MN (ed) (2017) *Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations*. Cambridge University Press, Cambridge
- Schrogl KU and Neumann J (2009) Article IV. In *Cologne Commentary on Space Law, Volume 1*, Carl Heymanns Verlag, Cologne, pp 70-85
- Shaw JE (1999) The Influence of Space Power upon History 1944-1998, *Air Power History* 46:20-29
- Stephens D (2018) The International Legal Implications of Military Space Operations: Examining the Interplay between International Humanitarian Law and the Outer Space Regime, *International Law Studies* 94:75-101
- Stephens D and Steer C (2015) Conflicts in Space: International Humanitarian Law and its Application to Space Warfare, *Annals of Air and Space Law* 40:1-32
- Strydom HA (2017) Weapons of Mass Destruction. In Wolfrum R (ed), *Max Planck Encyclopedia of Public International Law*, Oxford University Press, Oxford
- Tronchetti F (2015) Legal Aspects of the Military Uses of Outer Space. In von der Dunk F and Tronchetti F (eds), *Handbook of Space Law*, Edward Elgar, Cheltenham
- UN General Assembly (2001) Draft Articles on Responsibility of States for Internationally Wrongful Acts with Commentaries, UN Doc. A/56/10
- Vermeer A (2007) A Legal Exploration of Force Application in Outer Space, *Military Law and Law of War Review* 46:299-340
- Vlasic IA (1981) Disarmament Decade, Outer Space and International Law, *Annals of Air and Space Law* 26:135-206
- Watkin K (2014) Targeting “Islamic State” Oil Facilities, *International Law Studies* 90:499-513
- Weeden B (2012) 2007 Chinese Anti-Satellite Test: Fact Sheet, [https://swfound.org/media/205391/chinese\\_asat\\_fact\\_sheet\\_updated\\_2012.pdf](https://swfound.org/media/205391/chinese_asat_fact_sheet_updated_2012.pdf), accessed 30 September 2019