

Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space

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Humanitarian Consequences and Constraints Under International Humanitarian Law (IHL) related to the Potential Use of Weapons in Outer Space

Working paper submitted by the International Committee of the Red Cross (ICRC)

I. Introduction

1. The use of weapons in outer space – be it through kinetic or non-kinetic means, using space- and/or ground-based weapon systems– can have significant impacts on civilians on earth. This is because technology enabled by space systems permeates most aspects of civilian life, making the potential consequences of attacks on space systems a matter of humanitarian concern.

2. This paper outlines the potential humanitarian consequences of (section II) and limits under international humanitarian law (IHL) (section III) to military operations in outer space, in particular when such operations would disrupt, damage, destroy or disable civilian or dual-use space objects.¹ These are matters of direct relevance to the mandate and work of the Group of Government Experts (GGE) on further practical measures for the prevention of an arms race in outer space.² They relate in particular to the substantive topics “existing legal regime in outer space and elements of general principles” and “elements of general obligations” considered by the GGE at its first session in August 2018. The paper concludes with elements that the GGE should consider in this regard (section IV). The paper complements the presentation made by the ICRC on the applicability of IHL in outer space warfare during the first session of the GGE in August 2018.

¹ It is acknowledged that military operations against ground-based components of such space systems would also have humanitarian consequences and raise issues under IHL, however they are not discussed in this paper.

² The GGE’s mandate is to “consider and make recommendations on substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including, inter alia, on the prevention of the placement of weapons in outer space.” Resolution adopted by the United Nations General Assembly on further practical measures for the prevention of an arms race in outer space, A/RES/72/250, 24 December 2017, para. 3.



II. Potential humanitarian consequences of the use of weapons in outer space

3. The use of weapons in outer space that would disrupt, damage, destroy or disable civilian or dual-use (i.e. carrying out both military and civilian functions) space objects could entail a range of humanitarian consequences. For example:

- Physically damaging or destroying space objects could generate a huge amount of space debris which could in turn damage or destroy in an unpredictable manner other space objects such as communication and weather satellites, among others, that support safety-critical civilian activities and essential civilian services on earth.
- Disaster prevention and mitigation (for example evacuation or other measures in anticipation of a hurricane) may also be seriously affected if weather satellites are disabled or damaged. In addition, satellite phones are used by humanitarian organizations and medical personnel to communicate in times of emergency, e.g. during natural disasters or armed conflicts, when mobile phone service is not available. In this respect, disruption of telecommunication services provided by communication satellites would hinder the delivery of humanitarian assistance and emergency relief that rely on satellite phones.
- Civilian vehicles, shipping, and air traffic controls increasingly rely on global navigation satellite systems (such as GPS, Beidou, Galileo and GLONASS), which may also be used by the military, potentially making these systems “dual use”. Disabling or damaging such navigation satellites, through kinetic or non-kinetic means, could have wide-reaching consequences for civilians on earth.

4. While the exact scope of these potential humanitarian consequences is uncertain and would merit further analysis by the GGE and other expert circles, it is clear that using force to disrupt, damage, destroy or disable space objects on which rely safety-critical civilian activities and services essential to civilian survival entails a risk of significant humanitarian consequences on earth.

III. Existing limits to military activities in outer space, in particular under IHL

5. Military uses of space objects have for several decades been an integral part of contemporary warfare. For example, armed forces rely on: satellite navigation systems to enable precision navigation and targeting; satellites to enable global communications, including for command and control; and space-based monitoring systems that allow advance warnings of missile attacks, surveillance and reconnaissance.

6. As the role of space systems in military operations increases, the likelihood that these systems will be targeted, whether it be their ground or space components or the link between them, also increases, with potentially significant consequences for civilians as outlined above. As was pointed out by the Chair of the GGE in his 31 January report, possible threats to space systems can be classified in order of growing intensity, ranging

from electronic warfare, cyber-attacks, directed energy attacks, to orbital-based anti-satellite systems, and ground-based anti-satellite weapons.³

7. Whatever military activities occur in outer space, such activities are constrained by existing international law, notably:

- The Outer Space Treaty,⁴ which recognizes the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes. Its Article IV prohibits the placement in orbit of objects carrying nuclear weapons or other weapons of mass destruction, instalment of such weapons on celestial bodies, and stationing of such weapons in outer space in any manner. The Outer Space Treaty also forbids the establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies, and requires that they be used exclusively for peaceful purposes.
- The UN Charter, which governs the lawfulness of the resort to force between States, prohibiting the threat or use of force, except as authorized by the UN Security Council under Chapter VII and in self-defence under Article 51.
- IHL, also known as the law of armed conflict or *jus in bello*, which *inter alia* establishes limits on the conduct of hostilities in armed conflict with the purpose of limiting their effects for humanitarian reasons. The applicability of IHL in outer space is confirmed by Article III of the Outer Space Treaty, which states that international law applies to the use of outer space; international law includes IHL. It is important to emphasise that IHL applies to any military operations conducted in the context of an armed conflict, including those occurring in outer space, regardless of whether or not the resort to force that triggered the armed conflict is lawful under the UN Charter (*jus ad bellum*). IHL does not legitimize the use of force in outer space nor its militarization or weaponization. Indeed, the sole aim of IHL is to preserve a measure of humanity in the midst of armed conflict, notably to protect civilians.

8. IHL rules on the conduct of hostilities are found primarily in the 1977 Additional Protocols to the Geneva Conventions⁵ and in customary law.⁶ These latter rules govern the choice of means and methods of warfare, however and wherever used.⁷

9. The use of force in outer space in the context of an armed conflict to disrupt, damage, destroy or disable space objects is limited by IHL rules governing the conduct of hostilities, notably:

³ Report by the Chair of the Group of governmental experts on further practical measures for the prevention of an arms race in outer space, 31 January 2019, p. 9.

⁴ 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies.

⁵ 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 and 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.

⁶ See Jean-Marie Henckaerts and Louise Doswald-Beck, Customary International Humanitarian Law, ICRC, Cambridge University Press, 2005 (hereinafter “ICRC Customary IHL Study”).

⁷ The International Court of Justice has recalled that the established principles and rules of humanitarian law applicable in armed conflict apply “to all forms of warfare and to all kinds of weapons”, including “those of the past, those of the present and those of the future”: ICJ, Threat or Use of Nuclear Weapons, Advisory Opinion, 8 July 1996, para. 86, p. 37. This is also the reason for which legal review of new weapons is required, see Art. 36 of the First Additional Protocol.

- The requirement that the parties to an armed conflict distinguish at all times between civilian objects on the one hand and military objectives on the other, and direct their attacks only against military objectives.⁸
- The prohibition of indiscriminate attacks, that is, attacks that are not directed at a specific military objective, or that employ a means or method of warfare that cannot be directed at a specific military objective or the effects of which cannot be limited as required by IHL, and consequently are of a nature to strike civilian objects and military objectives without distinction.⁹
- The prohibition to launch an attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.¹⁰ When assessing the proportionality of an attack, the foreseeable “knock-on” or “reverberating” effects of the attack must be considered.
- The requirement, in the conduct of military operations, to take constant care to spare the civilian population, civilians and civilian objects, and to 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 civilian casualties and damage to civilian objects.¹¹

10. A kinetic operation against a space object constitutes an attack under IHL¹² governed by these rules. However, a space object could also be disabled (rendered dysfunctional) without being physically damaged, for example by directed energy/laser weapons or a cyber-attack. In the ICRC’s view, such non-kinetic operations constitute attacks under IHL, and therefore are also governed by the above-mentioned rules, among others.¹³ Furthermore, attacking, destroying, removing or rendering useless objects indispensable to the survival of the civilian population is prohibited.¹⁴

11. IHL forbids targeting civilian objects in outer space. However, civilian satellites, or some of their payloads (for example a specific transponder on a satellite bus), may also service armed forces, and are hence of a ‘dual-use’ nature. They may become military objectives, provided that their use for military purpose is such that they fulfil the definition under Article 52(2) of the First Additional Protocol.¹⁵ But, as mentioned above, disabling

⁸ Rules 7 to 10 of the ICRC Customary IHL Study.

⁹ Rules 11 and 12 of the ICRC Customary IHL Study.

¹⁰ Rule 14 of the ICRC Customary IHL Study.

¹¹ Rules 15 and 17 of the ICRC Customary IHL Study.

¹² For the purposes of the above-mentioned rules, an “attack” is defined by IHL as an act of violence against the adversary, whether in offence or in defence. See Article 49(1) of the First Additional Protocol. It is important to note that the notion of “attack” under IHL is distinct from that of “armed attack” under Article 51 of the UN Charter.

¹³ The reference to “neutralization” in the definition of military objective (Article 52 of the First Additional Protocol) would be superfluous if an operation aimed at disabling an object (i.e. its neutralization) would not constitute an attack. Furthermore, an overly restrictive understanding of the notion of attack would be difficult to reconcile with the object and purpose of the rules on the conduct of hostilities, which is to ensure the protection of the civilian population and civilian objects against the effects of hostilities.

¹⁴ Rule 14 of the ICRC Customary IHL Study.

¹⁵ Article 52(2) of the First Additional Protocol defines “military objectives” as “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”.

the civilian functions of such satellites could disrupt large segments of modern-day societies, especially if they also support safety-critical civilian activities and essential civilian services on earth. The foreseeable direct and knock-on (reverberating) incidental civilian harm and damage to civilian objects expected from an attack against a dual-use satellite must be considered when assessing the lawfulness of such attack under the IHL prohibitions of indiscriminate and disproportionate attacks and when taking all feasible precautions in the choice of means and methods of warfare to avoid incidental civilian harm and damage to civilian objects.

12. Another issue of concerns is the risk posed by space debris. Debris can be created by a host of space activities. This could be the case of a kinetic attack on a satellite, which risks causing far more debris than other space activities. Debris may continue to travel in the orbits in which they are produced for decades or more. Given the speed at which they travel, debris risk damaging other satellites supporting civilian activities and services. This would have to be considered when assessing, and may limit, the choice of means and methods of warfare in outer space.

IV. Summary and recommendations

13. The ICRC is concerned by the potentially high human costs of the use of weapons in outer space. While space objects have been employed for military purposes since the dawn of the space era, the weaponization of outer space would increase the likelihood of hostilities in outer space, with potentially significant humanitarian consequences for civilians on earth. This is an issue of serious concern which merits further attention and analysis of the GGE and other expert circles.

14. As with the development of any new means or methods of warfare, the weaponization of outer space is not inevitable but is a choice, which States may decide to limit for a range of reasons, including humanitarian reasons. In the meantime, weaponization of outer space would not occur in a legal vacuum, but is constrained by existing law, notably the Outer Space Treaty, the UN Charter and IHL rules governing the conduct of hostilities, including prohibitions and limitations on the use of certain means and methods of warfare. To be clear, the fact that IHL applies does not prevent States from agreeing on further rules to prohibit or limit specific military activities or weapons in outer space, as they did in the Outer Space Treaty. States may decide that further such prohibitions or limitations may be warranted to reduce the risks of significant civilian harm (including the risks outlined in section II) that could ensue from the use of weapons in outer space.

15. The ICRC urges the GGE to acknowledge, in its recommendations on substantive elements of an internationally binding legal instrument, the potentially significant humanitarian consequences that the use of weapons in outer space could entail for civilians on earth and the applicability of IHL to the conduct of hostilities in outer space. Furthermore, it would be beneficial for the GGE to consider a dedicated discussion on the potential humanitarian consequences of the weaponization of, and use of weapons in outer space on civilian populations on earth, in particular the impacts of directly or incidentally disrupting, damaging, destroying or disabling satellites that support safety-critical civilian activities and essential civilian services on earth.