

REPORTS AND DOCUMENTS

The potential human cost of the use of weapons in outer space and the protection afforded by international humanitarian law

Position paper submitted by the International Committee of the Red Cross to the Secretary-General of the United Nations on the issues outlined in General Assembly Resolution 75/36, 8 April 2021

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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 – could have significant impacts

This position paper is available in the six United Nations languages at: <https://www.icrc.org/en/document/potential-human-cost-outer-space-weaponization-ihl-protection>.

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 matter is of direct relevance to the issues outlined in Resolution 75/36 “Reducing space threats through norms, rules and principles of responsible behaviours” adopted by the United Nations (UN) General Assembly on 7 December 2020 (hereinafter “the Resolution”). The Resolution notably:

- “[e]ncourages Member States to study existing and potential threats and security risks to space systems, including those arising from actions, activities or systems in outer space or on Earth, characterize actions and activities that could be considered responsible, irresponsible or threatening and their potential impact on international security, and share their ideas on the further development and implementation of norms, rules and principles of responsible behaviours and on the reduction of the risks of misunderstanding and miscalculations with respect to outer space;”¹
- “[r]equests the Secretary-General ... to seek the views of Member States on the issues ... and to submit a substantive report, with an annex containing these views, to the General Assembly ... for further discussion by Member States”.²

3. In line with its humanitarian mission and mandate, the International Committee of the Red Cross (ICRC) submits this position paper to the Secretary-General to contribute its expertise to the discussion. The paper lays out the potential human cost of the use of weapons in outer space (section II) and the existing limits to such use under international law (section III).³ It concludes with recommendations that States and the Secretary-General’s report are invited to consider in this regard (section IV).

II. Potential human cost of the use of weapons in outer space

4. The human cost of using weapons in outer space that could disrupt, damage, destroy or disable civilian or dual-use space objects is likely to be significant. For example:

- Critical civilian infrastructure needed for health care, transportation, communications, energy and trade is increasingly dependent on space systems. These space systems are often “dual use”, i.e. they perform both military and civilian functions. For instance, global navigation satellite systems (e.g. GPS, Beidou, Galileo and GLONASS) play an essential role in civilian transport systems, such as air traffic controls and maritime shipping.

1 UN General Assembly, UN Doc. A/RES/75/36, 7 December 2020, para. 5.

2 *Ibid.* para. 6.

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

They are also crucial for precise time synchronization of critical civilian infrastructure, such as global communication networks, banking systems, financial markets and power grids. These systems may also be used by the military, which could make them military objectives in specific circumstances. Disabling or damaging such satellites, through kinetic or non-kinetic means, could have wide-reaching consequences for civilians on earth.

- Space objects, particularly weather, communication, navigation, and earth observation/imaging satellites, contribute to every phase of humanitarian work, from needs assessment to emergency relief delivery, from early recovery to disaster and conflict risk reduction. Communication satellites enable first responders, medical personnel and humanitarian workers to communicate in times of natural disaster or armed conflict, when mobile phone networks and internet services may be dysfunctional. Weather satellites provide time-sensitive information to prevent or mitigate the impacts of severe weather events such as hurricanes. Navigation satellites can support logistics and provide low-cost and accurate real-time location tracking for personnel and large equipment necessary for the delivery of humanitarian assistance. And, earth observation satellites offer unique information and imagery for emergency mapping, risk assessment, and planning and implementation of humanitarian operations. Accordingly, disruption of satellite services would hinder the delivery of humanitarian and emergency relief.
- Lastly, space debris is already a growing concern. Physically damaging or destroying space objects could generate a huge amount of such debris, which may continue to travel in the orbits in which it is produced for decades or more. Given the speed at which it travels, it could damage or destroy in an unpredictable manner other space objects that support safety-critical civilian activities and essential civilian services on earth. Such risks are growing owing to the increased congestion in orbit, partly as a result of the increased launch of new satellites, including commercial satellites, in recent years. The use of weapons in space could multiply such risks exponentially.

5. The exact scope of the consequences of using weapons to disrupt, damage, destroy or disable space objects is uncertain and merits further analysis. In any case, if activities and services that are critical for civilians' safety or essential to their survival rely on space objects, the use of weapons affecting these objects entails a risk of significant human cost on earth.

III. Existing limits under international law on the use of weapons and other military activities in outer space

6. Military use of space and space objects has been an integral part of contemporary warfare for several decades. For example, armed forces rely on satellite navigation systems to enable precision navigation and targeting; on satellites to enable global communications, including for command and control; and on space-based

monitoring systems that allow advance warnings of missile attacks, surveillance and reconnaissance.

7. As the role of space systems in military operations during armed conflict increases, the likelihood of these systems being targeted, whether it be their ground or space components or the link between them, also increases, with the potentially significant consequences for civilians described above. Possible threats to space systems include electronic warfare, cyber attacks, directed energy attacks and orbital-based and ground-based anti-satellite weapons.

8. Whatever military activities take place in outer space, they are constrained by existing international law, as the Resolution notably recalls.⁴ Relevant international law includes:

- The Outer Space Treaty,⁵ 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, the instalment of such weapons on celestial bodies and the stationing of such weapons in outer space in any other manner. The 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 the moon and other celestial bodies be used exclusively for peaceful purposes.
- The UN Charter, which governs the lawfulness of the resort to force between States and prohibits the threat or use of force, except as authorized by the UN Security Council under Chapter VII and in self-defence under Article 51. The UN Charter also mandates Member States to settle their international disputes by peaceful means.
- International humanitarian law (IHL), also known as the law of armed conflict or *jus in bello*, which, *inter alia*, establishes rules on the conduct of hostilities with the aim of limiting, for humanitarian reasons, the effects of armed conflict.⁶ It includes, in particular, the principle of distinction, the prohibition of indiscriminate and disproportionate attacks, and the obligation to take all feasible precautions to avoid, or at least to minimize, incidental civilian harm.⁷ In the ICRC's view, these rules apply not only to kinetic operations

4 UN General Assembly, UN Doc. A/RES/75/36, 7 December 2020, preamble and para. 1.

5 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (1967), adopted by UN General Assembly Resolution 2222 (XXI), 19 December 1966.

6 The applicability of IHL in outer space is confirmed by Article III of the Outer Space Treaty, which requires States to “carry on activities in the exploration and use of outer space ... in accordance with international law”. International law includes IHL. See also International Court of Justice, *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, 8 July 1996, para. 86.

7 IHL rules on the conduct of hostilities are found primarily in the 1977 Protocols additional to the Geneva Conventions of 1949, as well as in customary law. The latter rules govern the choice of means and methods of warfare, however and wherever used; see Jean-Marie Henckaerts and Louise Doswald-Beck, *Customary International Humanitarian Law*, ICRC/Cambridge University Press, 2005, in particular Rules 1 to 24: https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul. For the purposes of applying these rules, an “attack” is defined by IHL as an act of violence against the adversary, whether in offence or in

against space objects, but also to non-kinetic operations that would disable space objects without necessarily damaging them physically. When assessing the lawfulness of such attacks, all foreseeable direct and indirect incidental harm or damage to civilian objects must be considered, including when targeting a dual-use space object. The risk of creating debris and its indirect effects, as discussed in section II of this paper, should also be considered when applying these rules.⁸ IHL also prohibits weapons that are of a nature to cause superfluous injury or unnecessary suffering and that are indiscriminate by nature, as well as a number of specific types of weapon.

9. It is important to emphasize that IHL applies to any military operations conducted in the context of an armed conflict, including those occurring in outer space, regardless of whether 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. Despite the long-term desire of the international community to free outer space “from an arms race and conflict”, as is reiterated in the Resolution,⁹ in the event of armed conflict the sole aim of IHL is to preserve a measure of humanity, notably to protect civilians.

10. The International Court of Justice has recalled that the established principles and rules of IHL applicable in armed conflict apply “to all forms of warfare and to all kinds of weapons, those of the past, those of the present and those of the future”.¹⁰ In this respect, States party to the 1977 Additional Protocol I are required to review the legality of any new space weapon, means or method of warfare that they decide to develop or acquire – be it kinetic or not, space based or ground based – to ensure that its employment complies with IHL and other relevant rules of international law, including the Outer Space Treaty.¹¹ All States have an interest in doing so to ensure that their armed forces are capable of conducting hostilities in accordance with their international obligations.¹²

IV. Conclusions and recommendations

11. 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 impacts for civilians on

defence; see Additional Protocol I (1977), Article 49(1). 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.

8 For a detailed explanation of how IHL rules on the conduct of hostilities apply to the use of weapons in outer space, see ICRC, *International Humanitarian Law and the Challenges of Contemporary Armed Conflicts*, ICRC, Geneva, 2019, pp. 33–34.

9 UN General Assembly, UN Doc. A/RES/75/36, 7 December 2020, para. 3.

10 International Court of Justice, *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, 8 July 1996, para. 86.

11 Additional Protocol I (1977), Article 36.

12 ICRC, *A Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measures to Implement Article 36 of Additional Protocol I of 1977*, ICRC, Geneva, 2006, p. 1.

earth. In this respect, the ICRC recommends that future national and multinational discussions and processes acknowledge:

- the potentially significant human cost for civilians on earth of the use of weapons in outer space
- the protection afforded by the IHL rules that restrict belligerents' choice of means and methods of warfare, including in outer space, on the understanding that acknowledging the applicability of IHL neither legitimizes the weaponization of or hostilities in outer space, nor in any way encourages or justifies the use of force in outer space.

12. In particular, it would be beneficial for States to consider including in the study of “existing and potential threats and security risks to space systems”¹³ the potential humanitarian consequences of the weaponization of and use of weapons in outer space on civilian populations on earth. It is notably critical to consider in this respect the harmful impacts of directly or incidentally disrupting, damaging, destroying or disabling satellites that support safety-critical civilian activities and essential civilian services on earth.

13. For the protection of the civilian population and civilian infrastructure, the ICRC believes that any “common understanding of how best to act to reduce threats to space systems”¹⁴ among States should include recognizing that military operations in outer space do not occur in a legal vacuum but are constrained by existing law, notably the Outer Space Treaty, the UN Charter and IHL, including prohibitions and limitations on the use of certain weapons, means and methods of warfare.

14. As with the development of any new means or methods of warfare, the weaponization of outer space is not inevitable but a choice. States may decide to set limits in this regard for a range of reasons, including humanitarian ones. Nothing prevents States from agreeing on additional rules to prohibit or limit specific military activities or weapons in outer space, as they did in the Outer Space Treaty, in light of the risks of significant civilian harm. This includes the further development of “norms, rules and principles of responsible behaviours” to reduce space threats, as referred to in the Resolution.¹⁵ If new norms, rules and principles of responsible behaviours are developed, they must be consistent with and should build on and strengthen the existing legal framework.

15. The ICRC is grateful for the opportunity to share its views through this position paper. It also stands ready to lend its expertise to any future discussion on this matter, as States deem appropriate.

13 UN General Assembly, UN Doc. A/RES/75/36, 7 December 2020, para. 5.

14 *Ibid.* para. 3.

15 *Ibid.* para. 5.