



How would IHL apply to hostilities in outer space?

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Despite the longstanding efforts of the international community to prevent an arms race in outer space, the rules governing the potential use of force there is something worth serious consideration – and we have already have seen spill-over effects of terrestrial conflicts into space. This raises the question, how would international humanitarian law (IHL) apply to the conduct of hostilities in outer space?

In this post, part of a series on War, Law and Outer Space, Svenja Berrang, Legal Adviser for the German Federal Ministry of Defence, gives a short overview of the basic IHL principles of distinction, proportionality, and precaution and takes a closer look at the challenges in their application to outer space posed by the widespread dual-use of space systems, the employment of civilian operators for space systems used by the military, and the creation of space debris by attacking a space object.

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When we hear about “war in space”, our mind immediately jumps to Star Wars and intergalactic battles. This sci-fi fantasy could not be further from today’s reality, but this does not mean that outer space is a domain free from military activities. On the contrary, contemporary military operations are nearly impossible without the support of space-based systems. The use of outer space has greatly enhanced the ability to anticipate threats and respond to crises with greater speed, effectiveness, and precision. Consequently, over the last decade, with the set up of multiple space forces by major space-faring nations as well as NATO declaring outer space a fifth operational domain, we have seen a paradigm change.

The mere fact that outer space was not explicitly referred to as a domain of warfare in the core treaties or customary rules of IHL does not preclude this body of law from applying to it. As for any other military operation conducted in the context of an armed conflict, military operations in, from, to or

through outer space, including those that are carried out in outer space or the effects of which extend to outer space, are bound by IHL. This is confirmed by *Article III* of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the OST). Furthermore, as the International Court of Justice (ICJ) puts it in its *Nuclear Weapons Opinion* (para 86), IHL “applies to all forms of warfare and all kinds of weapons, those of the past, those of the present and those of the future”.

The basic IHL principles governing the conduct of hostilities, such as the principle of distinction, the principle of proportionality, and the principle of precaution, therefore apply to military space activities conducted in the context of an armed conflict and are examined here.^[1]

The principle of distinction

The principle of distinction obliges parties to a conflict to distinguish at all times between military objectives and civilian objects, as well as between combatants and civilians, and to direct operations only against military objectives (*Article 48, AP I*). It is recognized by the ICJ as a “cardinal principle” of IHL (ICJ, *Nuclear Weapons Opinion*, paras. 78-79), and forms part of customary international law (Customary IHL Rules 1 and 7).

Distinction between military objectives and civilian objects

Space whose use is characterized by the dual-use of space systems poses a specific challenge to the distinction between military objectives and civilian objects. *Article 52 (2) of Additional Protocol I* defines military objectives as “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.” Civilian objects are all those that are not military objectives; they are protected from being attacked during armed conflicts (*Art. 52 (1) AP I*).

The reliance on commercial satellites and commercial providers to support military activities is widespread. Most commercial space systems serve military and civilian purposes simultaneously – often referred to as “dual-use” – providing services to the civilian population and militaries alike, such as communications or products of commercial space systems used by the military, including imagery and data from Earth observation satellites.

A dual-use commercial satellite may become a military objective, only if the above-mentioned cumulative conditions set up by *Article 52 (2) of AP I* are met, i.e. if its use effectively contributes to military action, and if its total or partial destruction, capture or neutralization offers a definite military advantage in the circumstances ruling at the time, in spite of its concurrent civilian use, purpose or nature.

In this case, any attack against the dual-use commercial satellite would remain governed by the prohibitions of indiscriminate attacks and the principles of proportionality and precautions in attack under IHL. This raises other questions, such as whether the space system as a whole or only the part that contributes to the military action can be legitimately attacked? The answer to this question merits a thorough case-by-case analysis of the definite military advantage offered by its destruction, capture, or neutralization and a careful application of the principles of proportionality and precautions, examined below.

Distinction between combatants and civilians

Not only are commercial space systems overwhelmingly dual-use in nature and operated by civilians, but even “purely military” space systems are often operated by commercial companies. This begs the question: can civilians operating a military or a commercial space system that supports military activities in an armed conflict directly participate in hostilities and consequently lose their protection under IHL for such time as they directly participate in hostilities, as per *Article 51 (3) of AP I*?

This is a complex legal issue, and every activity by a civilian operator of the military or dual-use space system must be carefully evaluated on a case-by-case basis. Civilians operating military space systems or space systems that provide support to military operations can be considered as taking direct part in hostilities, if their acts are likely to adversely affect the military operations or military capacity of a party to the conflict, there is a direct causal link between their acts and the adverse effects, and the acts are specifically designed to inflict harm in support of a party to the armed conflict and to the detriment of another (belligerent nexus) (*ICRC Interpretative Guidance on the Notion of Direct Participation in Hostilities*). It is a rather high bar for a civilian operator’s activity to meet all of these criteria. That said, this remains a possibility under certain circumstances. For example, a civilian operating a reconnaissance satellite whose duty is to produce and transmit imagery that is designed to be used directly for military targeting is very likely to qualify as directly participating in hostilities and consequently losing protection from attacks and the effects of hostilities for such time that they are directly participating in hostilities, for example when transmitting satellite images to the military. States and militaries need to be very cautious of that, as it raises the question of whether and which responsibilities to protect states might have towards those operators, in particular in light of the obligations of constant care in the conduct of military operations (*Article 57 (1) AP I*; Customary IHL Rule 15) and of passive precautions as further discussed below.

The principle of proportionality

The principle of proportionality prohibits parties to the conflict from launching 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” (*Article 51 (5)(b) AP I*).

The principle of proportionality is a corollary of the principle of distinction. Acknowledging that in the conduct of hostilities, causing incidental harm to civilians and civilian objects is often unavoidable, this principle places a limit on the extent of incidental civilian harm permissible. All foreseeable direct

and indirect harm on civilians and civilian objects against the direct military advantage anticipated have to be carefully balanced when planning, deciding upon, and launching an attack. For example, the destruction of a space system that provides positioning, navigation, and timing to civilians and the military alike could lead to plane crashes, traffic accidents, and disturbances in the global financial market – all devastating effects on the civilian population – while the military advantage due to a redundancy plan might be only marginal. Going back to our question as to which part of such a dual-use space system can be attacked, the proportionality assessment is relevant not only to foreseeable incidental civilian harm to other civilian objects and persons in space but also in terms of the foreseeable consequences for civilians in space and on earth of impairing the civilian use of this dual-use space system (see *here* and *here*).

The principle of proportionality is also pertinent to the issue of space debris. In particular, destructive attacks on space objects risk causing a large amount of space debris. Depending on the orbit and how congested the orbit is, debris can be expected to have a detrimental effect on the space environment and may cause a collision with and damage to civilian and neutral state objects travelling in the affected orbit, also leading to severe consequences on Earth for the civilian population and neutral states. Keeping in mind how dependent on space support we as an international community are, this must be considered when assessing proportionality.

For example, an anti-satellite weapon that intercepts and destroys a target in space may generate a massive cloud of debris that presents a persistent hazard to the space activities of astronauts, other space objects in orbit servicing civilians on Earth, and the current and future space activities of all space-faring states and other entities. Even small pieces travelling at an extremely high speed can destroy or damage any space object that it encounters in space. Depending on its altitude, the unpredictable threat posed by debris may spread and endure for decades or even centuries. With regard to an attack that is expected to cause debris, the proportionality assessment merits a thorough case-by-case analysis, and a wide variety of factors should be considered, such as number, orbit and duration of travel of the debris expected to be created.

The creation of space debris does not only concern the principle of proportionality, the prohibition on indiscriminate attacks, and the principle of precautions as subsequently discussed, but also other rules of IHL, notably the rules protecting the natural environment, such as *Articles 35(3) and 55(1) of AP I*, Customary IHL Rules 43, 44, and 45 and *Articles I and II of the Convention on the prohibition of military or any hostile use of environmental modification techniques*.

The principle of precaution

When an attack is launched, precautionary measures are required of both the attacking party and the party being attacked, in order to avoid or at least to minimize the incidental civilian harm. In other words, the principle of precaution entails obligations to take precautionary measures in attack, and against the effects of attack. This means parties to armed conflict must take constant care to spare the civilian population, civilians and civilian objects when conducting military operations (*Article 57(1) AP I*; Customary IHL, *Rule 15*).

Among the precautionary measures required before and during an attack, measures relating to the choice of means and methods of warfare (*Article 57(2)(a)(ii) AP I*; Customary IHL *Rule 17*), the assessment of the effects of the attack (*Art. 57(2)(a)(iii) AP I*; Customary IHL *Rule 18*) and the target selection (*Article 57(3) AP I*; Customary IHL *Rule 21*) are particularly relevant.

Regarding which part of a dual-use space object can be targeted: In line with the above-stated obligations, whenever feasible, means and methods of warfare – be they kinetic or non-kinetic – that affect only the parts of a space structure such as a payload or communication link used for military purposes and not the satellite bus or other payloads for civilian use, must be chosen to avoid or at least minimize incidental civilian harm. If it is, however, not feasible to attack the military payload separately, nor to select another target – such as the downlink communication or a ground segment of the satellite system solely used for military purposes – to achieve a similar military advantage while causing less danger to civilian lives and to civilian objects, an attack on the satellite bus as a military objective would be permissible after a thorough proportionality analysis, as pointed out above.

The debris created by such an attack needs to be analysed with regards to the above-stated duty as well. The principle of precaution in this regard is even further strengthened by the “due regard” principle enshrined in Article IX of the *OST*, which obliges states to carefully balance their interests with the consequences of its activities in space and the interests of other neutral states using space. This arguably leads to the obligation to at least minimise the creation of space debris as far as possible. Read in conjunction with the IHL principle of precaution, a thorough analysis of the possible and feasible means and methods of the attack is necessary before destroying a space asset, and it could be argued that parties to the conflict are obliged to employ those means and methods first that create no or the least amount of space debris, e.g. a cyber operation before using kinetic counter-space capabilities.

A further challenging question linked to the dual-use of space systems is whether militaries are even allowed to use civilian space systems to conduct or support military activities during armed conflicts in the first place, in light of the principle of precautions against the effects of attacks (“passive precautions”). This principle establishes an obligation for parties to the conflict to take all feasible precautions to protect the civilian population and civilian objects under their control against the effects of attacks (*Article 58 (c) AP I*; CIHL *Rule 22*).

Among the measures to implement this obligation, *Article 58 (a) AP I* obligates parties to the conflict “to the maximum extent feasible to remove (...) civilian objects under their control from the vicinity of military objectives”(see also Customary IHL *Rule 24*). The particular and feasible precautionary measures are always contextually determined. It could be argued that planning and preparation for such precautions must be taken in peacetime. Does this imply that the use of dual-use objects in an armed conflict is unlawful?

While it is clear that taking precautions against the effects of attack is a legal obligation rather than a mere recommendation, the term “to the maximum extent feasible” indicates that armed forces cannot be required to do the objectively impossible, but must act in good faith to take every precaution that is practicable or practically possible, taking into account all circumstances ruling at the time, including humanitarian and military considerations.

The use of commercial space systems for military purposes is a long-established practice that cannot be changed easily and is further necessitated by the extremely high costs that come with the operation of space systems during all phases (i.e. development, construction, launch, operation in space, de-orbiting). The widespread practice of dual-use systems is owed to this financial burden. Thus, one could argue that it is neither practical nor practicably possible to completely separate military space systems from civilian ones in order to carry out military activities during armed conflicts.

Conclusion

It is a fact that international law, including IHL, applies to outer space. The specific characteristics of space pose challenges to the application of the principles of IHL governing the conduct of hostilities to military operations in, from, to, or through outer space in the context of an armed conflict, especially with regard to the relationship between commercial space actors and military activities in space as well as the inevitable creation of space debris when destroying or physically damaging a space object. In today’s strategic environment, states and militaries urgently need to address those challenges with a view to avoiding and in any event minimizing the civilian harm due to hostilities involving outer space. A thorough interpretation and careful analysis of the core principles of IHL is necessary, with the experiences, interpretations, and thresholds gained in the traditional domains over the last decades.

Author’s note: The thoughts and opinions expressed in this post are those of the author and do not represent any position of the German government or the German Federal Ministry of Defence.

[1] It is important to underline that other IHL rules, such as the obligation of constant care when conducting military operations, the prohibition against indiscriminate attacks, the prohibition on the use of indiscriminate weapons and weapons causing superfluous injury or unnecessary suffering, and a number of rules specifically protecting certain objects and persons, also apply to outer space. However, due to the length limit, this post only discusses in detail the above-mentioned three principles applicable to military space operations during an armed conflict.

See also:

- Nivedita Raju, *Space security governance: steps to limit the human costs of military operations in outer space*, August 22, 2023
- Gilles Doucet, *Dr. Stuart Eves, Reducing the civilian cost of military counter-space operations*, August 17, 2023
- Wen Zhou, *War, law and outer space: pathways to reduce the human cost of military space operations*, August 15, 2023
- Pavle Kilibarda, *Space law revisited (1/3): The notion of ‘peaceful uses’ and the Outer Space Treaty*, November 7, 2016

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