The Applicability of Rules of International Humanitarian Law to Military Conflicts in Outer Space: Legal Certainty or Time for a Change?

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Abstract

Space has become an integral part of 21st century warfare. Today space assets are used for a variety of military purposes, such as gathering intelligence, conducting surveillance and reconnaissance, facilitating instantaneous global communication and enabling precision attack.

The integration of space-based assets into ground, land and sea warfare is expected to grow, as new combat systems dependent on space capabilities are developed and an increasing number of States use space for military reasons. Ultimately, outer space might well become a battlefield, with attacks conducted by States or private individuals in, from, and within space. The risk of a conflict in space is also increased by the growing dependence of modern societies on space technologies and by the consequent need to militarily protect valuable space assets. Therefore, taking into consideration the possibility of military confrontation in outer space it is legitimate to investigate the legal regime applicable to armed conflict in and from outer space.

The principles regulating the conduct and responsibilities of belligerent States, neutral States and individuals engaged in warfare are provided for in International Humanitarian Law (IHL), also called as law of armed conflict. IHL, although primary developed to govern conflict on the ground, is widely recognized by scholars and military experts as being relevant to regulate the use of force in, from and within outer space. Nevertheless, the applicability of some fundamental principles of IHL to conflicts in space, such as proportionality of attacks, military necessity, reduction or avoidance of collateral damage to the environment and to civilians or civilian objects, appears to be rather problematic due to the fragile nature of the space environment and the dual (both civilian and military) use of the majority of satellites. This fact generates uncertainty about the applicable legal rules in the event of military

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confrontation in outer space. Additionally, it is questionable if the UN sponsored space treaties, and in particular the 1967 Outer Space Treaty, are relevant during armed conflict.
In the light of the above the present paper examines to what extent IHL principles are applicable to outer space and discusses whether these principles should be adapted to the unique characteristics of the space environment, so as to enable legal certainty and predictability of acts in the unfortunate event of a conflict in outer space.

I Introduction

Outer space has remained a weapons free environment and an area extraneous of military confrontation in the past 50 years. This significant result has been the direct consequence of political and strategic choices of the space-faring States but also of the fact that space activities, necessarily require a high level of international cooperation.
However, due to the increasing dependence of modern societies on space assets and the advantages that the use of outer space gives from a military perspective, ensuring a reliable level of protection for valuable space assets and creating the political and technological conditions to ensure such protection are progressively becoming priorities for States. These developments not only entail the risk of generating tensions relating to the use of and access to outer space but also have the potential to eventually result in military confrontations in outer space. Indeed, it is not hard to envision that satellites might well become the target of attacks from the ground in the context of a conflict occurring on Earth and that outer space itself might become a battlefield, with attacks conducted by States or private individuals in, from, and within space. Therefore, taking into consideration the possibility of military confrontation in outer space, it seems a proper time to investigate the legal regime applicable in the event of an armed conflict in and from outer space and the legitimate actions that States might take.
International Humanitarian Law (IHL), also known as Law of Armed Conflict (LOAC) or *jus in bello*, is the set of laws that becomes applicable once a conflict has begun and regulate the conduct of belligerents. IHL rules are relevant to outer space in virtue of Art. III of the 1967 Outer Space Treaty, which makes international law applicable to outer space activities. Nevertheless, due to the peculiar and fragile nature of the space environment as well as the dual (both civilian and military) use of satellites, the way and the extent to which fundamental *jus in bello* principles, such as discrimination and proportionality of attacks, apply to outer space appears to be rather controversial. This fact generates uncertainty about the relevant legal regime in the case of military confrontation in outer space and causes fear that conflicts in space could be run substantially un-regulated, with all the consequences that this could entail. Furthermore, the status of the space treaties in time of war is questionable.

Considering these issues, the purpose of the present paper is to analyze how IHL principles should be applied to outer space and the way belligerents should conduct their military operations in unfortunate event of a conflict in space. Additionally, the paper discusses the possible steps that States could undertake in order to establish internationally agreed and recognized rules specifically regulating armed hostilities in outer space.

Before proceeding with the analysis two considerations need to be made.

Firstly, the paper only focuses on the relevance of jus in bellum rules to outer space, while leaving aside considerations of jus ad bellum nature, in particular whether or not the use of force is legitimate. Under the paper it is assumed the right to use force, for example for reasons of self-defence reason or by means of authorization by the United Nations Security Council, has been legally triggered and attention is thus focused on the legal framework applicable to military conflicts in space, particularly on rules to be followed by belligerents in order to reduce collateral damage to civilians, civilian space objects and the space environment.

Secondly, in order to avoid potential misunderstanding of the purpose of this paper, it should be emphasized that a discussion on the legal regime applicable in case of a conflict in space should not and cannot be seen as a move towards facilitating or even legalizing similar conflicts. On the contrary, such a discussion is intended to identify and, if needed, to suggest how to improve, the legal framework regulating military confrontations in space, so as to ensure a minimum order and an acceptable level of security in the unfortunate event of military engagements taking place in the space environment. Moreover, international law has long established rules governing the conducts of belligerents with regard to conflict on Earth: this has not, in any way, facilitate or contribute to the emergence of such conflicts. Furthermore, the technology to strike and destroy space objects, or to merely render them temporarily un-operational is currently available.[1] Fourthly, the possibility to use military force in space, for example with the purpose of protecting national space objects from attacks or of defending the national territory from attacks from space, as well as to maintain technological superiority, is foreseen in the National Space Policies and National Defence Policies and related documents of space-faring countries, such as the United States and China. In this respect, the 2010 National Space Policy of the United States of America provides that the Secretary of Defense shall: "*Develop capabilities, plans, and options to deter, defend against, and, if necessary, defeat efforts to interfere with or attack U.S. or allied space systems*; *Maintain the capabilities to execute the space support, force enhancement,*

1 *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies,* 27 January 1967, 610 U.N.T.S. 205, 18 U.S.T.,2410, T.I.A.S. No. 6347, 6 I.L.M. 386 (hereinafter *Outer Space Treaty*).

space control, and force application missions . . . ".[2] The Chinese National Defence Policy states that one of the primary national defence goals of China is to modernize and informatize military forces, an indirect reference to the use of space assets to support military operations on the ground - and to maintain its security interests in space, electromagnetic space and cyber space.[3] It should be stressed that none of this documents adopts an aggressive approach, namely military actions in space are never foreseen for aggressive but rather for defensive purposes. However, and this is the aspect relevant for the present paper, once an attack against a space objects has occurred and, as a result, the right to use force to respond to such an attack has been triggered, an escalation of the conflict with space objects belonging to the belligerent States being targeted is a foreseeable hypothesis. But once an attack occurs and response, then escalation. What legal framework would be applicable then? What limits to the States actions would exist? These are some of the reasons why the study of the legal regime governing military conflicts in outer space is relevant and timely.

II The Legal Framework Governing Military Activities in Outer Space

Before discussing the applicability of international humanitarian law rules to outer space, the most significant aspects of the legal regime governing military activities in outer space as well as on the kind of military uses of outer space currently performed by States need to be highlighted. It should be pointed out that the five UN sponsored space treaties do not contain rules to govern conflicts in outer space. These treaties are applicable in times of peace, although this does not mean that their applicability is excluded in case of a conflict, and contained provisions focusing on the prevention of conflicts

2 2010 National Space Policy of the United States of America, National Space Security Guidelines. The text is available at <www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf>. It can also be pointed out that the 2006 National Space Policy of the United States of America adopted a more active and 'aggressive' approach, as it established that: "The United States considers space capabilities – including the ground and space segments and supporting links – vital to its national interests. Consistent with this policy, the United States will: preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; take those actions necessary to protect its space capabilities; respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests. The text is available at <www.nss.org/resources/library/spacepolicy/2006NationalSpacePolicy.htm>.

3 The text of the 2010 National Defence Policy of China is available at 11:16:43 <http://news.xinhuanet.com/english2010/china/2011-03/31/c_13806851.htm>. On the Chinese approach see also Military and Security Developments Involving the People's Republic of China, Annual Report to Congress, Department of Defence, United States of America, 2007. The text of the report is available at <www.defense.gov/pubs/pdfs/2011_CMPR_Final.pdf>.

The legal regime governing military space activities is to be found in the Charter of the United Nations and UN space treaties, specifically the 1967 Outer Space Treaty.[4] The remaining three space treaties include clauses which have only an indirect impact on such activities and due to the limited size of this paper will not be addressed.

The Charter of the United Nations (hereinafter the Charter) is the highest source of international law and establishes rules to be complied with by States Parties in their international relations. The purpose of the Charter is the maintenance of international peace and security.[5] Article 2, para. 2 contains the seminal rule of the Charter's system, according to which States shall refrain from the threat or use of force against the territorial integrity or political independence of any State. The main exceptions to this prohibition are included in Article 51, which recognizes the inherent rights of self-defence of all States and in Chapter VII of the Charter, according to which the UN Security Council can authorize the use of force to maintain or restore international peace and security.

The applicability of the Charter to outer space is provided for in Article III of the Outer Space Treaty, pursuant to which international law, including the Charter of the United Nations, is applicable to activities in outer space in the interest of maintaining international peace and security.[6] Consequently, States are forbidden from using force in outer space unless if they are acting in self-defence or they have been authorized by the Security Council.[7]

The 1967 Outer Space Treaty is the basic instrument regulating activities in outer space. The most relevant provisions of the Treaty concerning the military uses of outer space are contained in Article IV. This Article provides for partial demilitarization of outer space only. It explicitly prohibits the placing of nuclear weapons and weapons of mass destruction in orbit around the Earth[8]. However, Article IV is silent on, and therefore it does not preclude, other military uses of outer space, such as the deployment and use of conventional weapons in Earth orbit, including anti-satellite devices and the transit of ballistic missiles carrying nuclear warheads through space.[9] Article IV, par. 2 deals with the use of the Moon and other celestial bodies, reserving them 'exclusively for peaceful purposes'. As par. 2 refers only to the Moon and other celestial bodies and omits any reference to 'outer space, this indicates that the empty space between the celestial bodies is not covered by its provisions.[10] The Outer Space

4 *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967, 610 U.N.T.S. 205, 18 U.S.T., 2410, T.I.A.S. No. 6347, 6 I.L.M. 386 (hereinafter *Outer Space Treaty*).

5 Art. 1, Charter of the United Nations.

6 Art. III, Outer Space Treaty.

7 See R.J. Lee, The *Jus ad Bellum in Spatialis*: The Exact Content and Practical Implications of the Law on the Use of Force in Outer Space, 29 J. of Space Law 2003, 93.

8 Art. IV, para. 1, Outer Space Treaty.

9 See W. Rathgeber W. & N.L. Remuss, Space Security: A Formative Role and a Principled Identity for Europe, ESPI Report January 2009, p. 12.

10 See B. Cheng, Studies in International Space Law (Clarendon Press, Oxford 1997), p. 257.

Treaty never defines the term 'peaceful purposes'. Two different interpretations of this term, the first as "non-military"[11], the second as "non-aggressive"[12] have been suggested. The "non-military" approach holds the prohibition to use outer space for any military purpose. The supporters of this approach often make reference to the 1959 Antarctic Treaty, where "peaceful purposes" is intended to mean "non-military".[13] Despite being popular in legal doctrine, the "non-military" interpretation appears to be contradicted by States' practice. Also the negotiation of the Outer Space Treaty do not support it.[14] The "non-aggression" approach argues that, as long as military activities in space are carried out in accordance with Article 2(4) of the UN Charter, they are consistent with international law. This approach, promoted by the United States, has progressively gained support and finds evidence in State practice.

In this regard, it has to be emphasized that space has become integral to 21st century warfare. Today space assets are used for a variety of military purposes, such as to gather intelligence, to conduct surveillance and reconnaissance, to make possible instantaneous global communication, to enable precision attack, etc. States have shown growing acceptance of these military uses of outer space which are generally referred to as "passive", in the sense that space assets are utilized as tools to support military operations on the ground and not as means to carry out acts of aggression in the space environment against other space objects.

Regardless of the interpretation given to this term 'peaceful', it is significant that Article IV, par. 2 combines it with the word 'exclusively'. This combination leaves little room for doubts about the scope of the prohibition sets forth in par. 2. Therefore, the Moon and other celestial bodies shall be free from military uses of any type

Apart from Article IV, other Articles of the Outer Space Treaty are relevant to our discussion. Article I, para.1, establishes the right of States to freely explore and use outer space. Article VI laid down the cardinal principle of the international responsibility of States for the space activities carried out by their nationals. Article IX provides for some 'indirect' limitations to military activities in

11 This view is supported by authors like: M.G. Markoff, Disarmament and peaceful purposes provisions in the 1967 Outer Space Treaty, J. Space L. 1976; 4: 3; I.A. Vlasic, Disarmament decade, outer space and international law, Ann. Air & Sp. L. 1981; VI; 26.

12 The non-aggressive view is supported by P.G. Dembling & D.M. Arons, The evolution of outer space treaty, J. Air L. & Com. 1967; 33: 419, 434; A. Meyer, Interpretation of the term peaceful in the light of the space treaty, Zeitschrift Fur Luft-und Weltraum 1969; 18:28., 34.

13 Preamble, Art. I and IV, Antarctic Treaty, December 1959, 12 UST 794, TIAS No. 4780, 402 UNTS 71. Preamble, Art. I and IV.

14 A proposal by India to extend the application of "exclusively for peaceful purposes" to all outer space areas was rejected by the US nor the Soviet Union because none of them wanted the limitations which this would have put on both States' future uses of space. See U.N. Doc. A/AC.105/PV.3 (Mar. 20, 1962), 63.

outer space. Indeed, the obligation for States parties to undertake consultations in case they believe that an activity or experiment would cause harmful interference with the activities of other States Parties in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, may clearly have implications on their military uses of outer space (Article IX, sentence 3). Summarizing, while States are forbidden from using outer space and space assets in an aggressive manners, i.e. attacks against space objects or against objects on Earth from space, and from placing WMD and nuclear weapons in Earth orbit, they are entitled to use outer space for certain passive military purposes. In this regard, more and more States are integrating space components in their national defence apparatus. Consequently, the importance of space assets from a national security perspective is growing.

A question particularly important for the purpose of the present paper is the status of the Outer Space Treaty in the event of a conflict in outer space. Although the treaty is an instrument meant to regulate space activities in times of peace, its applicability during conflicts cannot be automatically excluded. In legal doctrine there is a largely accepted interpretation arguing that, when a treaty has a law-making character, in the sense that it establishes rules governing the conduct of States in a particular area of international law, a war has no effect on its applicability among belligerents.[15] Therefore, because of its law-making function, the Outer Space Treaty is not *ipso facto* terminated by the outbreak of war and it remains in force. As it will be described further in the present paper, Articles VI and IX might have an important role to play in the event of an armed conflict in space.

III International Humanitarian Law (IHL)

III.1 Preliminary Considerations

International Humanitarian Law (IHL), also called law of armed conflicts (LOAC), or *jus in bello*, is the law that governs the way in which armed conflicts are conducted. In this respect, IHL rules address key issues related to war, such as choice of weapons, selection of targets and consequences of attacks. This branch of international law is usually referred to as International Humanitarian Law because it aims at reducing the suffering of the victims of war, i.e. civilians, and to reduce its deleterious effects.

International Humanitarian Law remains independent from questions concerning justification or legality of recourse to force, or its prevention. These questions are addressed within another branch of international law, namely the so-called *jus ad bellum*, which specifically seeks to limit recourse of force among States. Instead, International Humanitarian Law only focuses on the regulation of conflicts and their consequences on belligerents, non-belligerents and their properties.

15 I. Brownlie, *Principles of Public International Law* (Oxford University Press 2003), p. 592.

III.2 The Fundamental IHL Rules

International Humanitarian Law stems from the combination of customary international law, based on recognized practices of war, and treaty laws. The normative treaty architecture is provided for in the Hague and Geneva systems. The Hague system, which includes the Hague Regulations of 1899 and 1907, is centered upon the legitimacy of the means and methods of conducting hostilities. The Geneva system focuses on maintaining human security and dignity during armed conflicts. The Geneva system consists of the four Geneva Conventions of 1949, which protect war victims—the sick and wounded (First); the shipwrecked (Second); prisoners of war (Third); and civilians in the hands of an adverse party and, to a limited extent, all civilians in the territories of the countries in conflict (Fourth)—and the Additional Protocols of 1977, which apart from defining key terms such as *combatants*, contain detailed provisions to protect noncombatants, medical transports, and civil defense, and prohibit practices such as indiscriminate attack.[16] The International Court of Justice in the Nuclear Weapons Case has recognized the universal nature of this corpus of law as customary international law.[17]

Among the fundamental principles of IHL the following can be mentioned: 1) discrimination; 2) proportionality.

According to the principle of discrimination the lawful use of force should make distinction between servicemen and civilians, combatants and war victims, military targets and civilian assets. The bottom line of this rule is that civilians and civilian objects must not be directly attacked. Crucial to the application of this principle is the selection of targets. Article 48 of the Additional Protocol I to the Geneva Convention (hereinafter AP I) introduces the distinction between 'civilian' and 'military' objectives, providing that: "*In order to ensure respect for and protection of the civilian population and civilian objectives, the Parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objectives and military objectives and accordingly shall direct their operations only against military objectives*". Article 52(2) of the AP I gives effect to the principle of distinction laid down in Article 48 of the AP I. It sets out a two-pronged test in order to qualify an object as a military objective. First, a military objective must by its nature, location, purpose or use make an effective contribution to military action. Secondly, the objective's total or partial destruction, capture or neutralization, in the circumstances ruling at the time, must offer a definite military advantage. 'Constant care' has to be taken to 'civilian objects',[18] which are defined as 'all objects which are not military objectives'.[19]

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16 Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protections of Victims of International Armed Conflicts (Protocol I), 1125 U.N.T.S. (Dec. 12, 1997), hereinafter AP I.

17 Advisory Opinion, Legality of the Threat or Use of Nuclear Weapons, 1996 ICJ 226, 248-256 (July 8).

18 Article 57 (1), AP I.

19 Article 57 (2), AP I.

Closely connected with the principle of discrimination is the principle of proportionality. This principle requires that in the course of a legitimate attack, the collateral injury and damage to non-combatants and civilian properties must be proportionate to the purpose of the attack. Article 57 of the AP I states that those who plan or decide upon an attack shall: "*Refrain from deciding to launch any 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*". The principle of proportionality used to be a customary law of war and the Protocol I developed it into a treaty law.

Substantially, all that the law requires[20] is to weigh the *concrete* and *direct anticipated* military advantage against the *anticipated* loss of civilian lives; the latter must not be excessive in relation to the former.

Additionally, proportionality is to be intended in the sense of 1) proportionality of a belligerent response to a grievance; 2) proportionality in reaction to the adversary's military action or the anticipated military action.

It should be pointed out that Article 51 (3) of Additional Protocol I states that "*civilians shall enjoy the protection afforded by this Section, unless and for such time as they take direct part in hostilities*". This provision means that civilians who take direct part in an attack might be attacked. This interpretation of Article 51 (3) is object of debate though.[21]

A further IHL requirement is to avoid mistaken attacks and collateral damage, especially to the environment. Articles 35(3) and 55 of the AP I lay down provisions specifically aimed at protecting the environment. In particular, Article 35 (3) states that "*it is prohibited to employ methods or means of warfare which are intended or may be expected to cause widespread, long-term and severe damage to the natural environment*". Within Article 35 (3), the natural environment is itself the object of the protection.

Manuals of war emphasize three customary principles which incorporate the overarching principles of proportionality and discrimination: 1) military necessity; 2) humanity;) 3) chivalry.[22] Military necessity means that States may use force to partially or completely submit the enemy only if such a force causes minimum expenditure of time, life, and physical resources. Furthermore, the concept of 'military necessity' is connected with the idea of targeting objects which will give a definite military advantage. Humanity refers to the prohibition to employ any kind of force not required for the partial or total submission of the enemy. The idea of chivalry is related to the ban to use dishonorable means during a conflict. From this point of view, 'perfidy'. 'Perfidy' is the hostile use of a belligerent's obligation to respect IHL in order to kill, wound or capture another belligerent.

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20 Articles 51(5)(b) and 57(a)(ii), AP I.

21 See M.N. Schmitt, Humanitarian Law and Direct Participation in Hostilities by Private Contractors or Civilian Employees, 6 Chi. J. Int'l L. 2005, 511.

22 A. Roberts/R. Guelff (eds.), *Documents on the Laws of War*, Oxford Univ. Press 3rd ed. 2008, pp. 9-10.

IHL also addresses the status of a 'neutral State'. A 'neutral State' is any State that is not participating in a conflict as one of the belligerent State.[23] The key principle relating to neutrality "requires neutrals not to intervene directly or indirectly in a war and requires belligerents to abstain from involving them". The territory of a 'neutral State' is inviolable, so belligerent States are forbidden from attacking its territory.[24]

Under the law of neutrality, a neutral State does not have to prevent the export to a belligerent of "arms, munitions of war, or, in general, of anything which can be of use to an army or a fleet".[25] Basically, nothing in the law of neutrality expressly requires a neutral State to prevent its citizens from aiding a belligerent.

IV Applicability of IHL Rules to Outer Space: Legal Issues and Possible Solutions

IV.1 Preliminary Considerations

In the past decade the importance of space assets has significantly grown. Not only satellites have been progressively inserted in the military structure of the highly developed States but also they currently contribute to key services to modern societies, such as communication, meteorological forecast and disaster management. As a result of these factors, outer space has become a highly sensitive area in terms of international and national security and it is not hard to imagine that in the event of a conflict satellites could be seen as potential targets. This risk is furthermore enhanced by their vulnerable nature.

Fortunately, no military confrontation has occurred in outer space so far. However, it is important to understand what the legal framework applicable in a similar event would be, due to the fact that specific rules regulating the conduct of States in the course of military hostilities in space do not exist. Consequently, it is obvious to wonder about the applicability of international humanitarian law rules to outer space. As previously mentioned IHL rules are relevant to outer space in virtue of Article III of the Outer Space Treaty. Nevertheless, it cannot be argued that the *corpus* of the IHL applies *in toto* to armed conflict in outer void space because of the unique nature of this environment and the fact that applicability of several IHL rules, particularly those of the Hague system, is limited to conflict on lands. The principles included in the Geneva system and, more specifically those provided for in Additional Protocol I, are slightly more applicable because they gives protection against hostilities applying to land, air and sea which may affect the civilian population, individual

23 B. Hart, Anti-satellite weapons: threats, laws and the uncertain future of space, XXXIII Annals of Air &Space Law 2008, 344.

24 "The territory of neutral power is inviolable". Hague Convention (V) Respecting the Rights and Duties of Neutral Powers and Persons in Case of War on Land, 18 October 1907, Art. 1.

25 Art. 7, Hague V, see *supra* footnote 24.

civilian or civilian objects on land. Although some commentators argue their inapplicability to space,[26] this interpretation should be rejected. Indeed, there is no indication that drafters had wanted to exclude space; more appropriate interpretation is that it encompasses space-based attacks against land targets. It would also extend to attacks against space-based assets that would affect the civilian population.

Thus, having ascertained the relevance of at least certain IHL rules to space, the next section will analyze the problems which arise if these rules are applied to hypothetical space conflicts.

IV.2 Applicability of IHL Rules to Outer Space

As previously described, 'discrimination' and 'proportionality' are two fundamental principles of LOAC.

'Discrimination' means that belligerents should carefully distinguish between military and civilian objects, as well as between military personnel and civilians when using military force. Attacks can be carried out against targets that qualify as 'military objectives'. 'Military objectives' are "*those objects which by their nature, location, or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization . . . offers a definite military advantage*".[27] From this definition it emerges that there are three criteria to classify an object as a 'military objective': 1) its nature; 2) its location; 3) its use. In order to apply these criteria to space objects it is necessary to point out that space objects can: 1) be of purely military nature; 2) have a dual character, namely they are able to be used for civilian and military purposes. All military satellites, as well as weapons placed in outer space, are 'military objectives' in virtue of the 'nature' criterion. Instead, it is problematic to classify dual-use space technologies as legitimate military targets. Civilian space objects may qualify as military objectives pursuant to the 'use' criterion if they perform military functions. Many dual satellites fulfill this criteria, i.e. navigation, communication, weather forecast satellites, which provide services for the military.

The applicability of the other criteria to dual-use space objects is more challenging. 'Purpose' refers to the "intended future use of an object".[28] It is certainly difficult to decide whether there is intention to convert objects from civil to military but when intention emerges the object becomes a legitimate target. Nevertheless, it is illegal to attack a civilian object merely because of its potential value to the enemy; in space, for example, it is illegal to destroy a commercial satellite in the absence of reliable information that the enemy wants to acquire imagery for military purposes. Pursuant to the third criterion, 'location', objects that by nature are not military become relevant to military

26 Y. Sandoz/C. Swinarsky/B. Zimmerman (eds.), *Commentary on the Additional Protocols of 8 June 1977 to the Geneva Convention of 12 August 1949*, 1987, paras. 1892-1899.

27 Art. 52 (2) AP I.

28 Commentary on Additional Protocols, see *supra* footnote 26.

purposes due to their position. 'Location' is probably the most distinguishing characteristic of space, because space offers the ultimate location from which an enemy territory can be observed. Thus, the total or partial destruction of a space object may provide a definite military advantage to a belligerent.
To sum up, if a civilian space asset fulfills the described condition and takes part in the conduct of hostilities, it loses his status as a protected civilian entity and becomes a legitimate object for the use of military force.[29] Nevertheless, any attack against space-based asset must meet other IHL conditions, such as proportionality and a definite military advantage.
A possible caveat concerning combat operations in space is the fact that IHL only prohibits attacks against 'civilian' or 'civilian objects'. Attack is defined as an "act of violence against the adversary, whether in offence or defence".[30] It includes non-kinetic operations that cause damage or destruction to civilian objects or injury to, or death of civilian. If operations do not reach this effect they would not constitute an attack and would, therefore, not be prohibited by IHL.[31] This distinction is particularly relevant in space where space objects can be 'attacked' in two ways: 1) by means of a kinetic destructive hit-to-kill weapon, such as an anti-satellite missile, which causes the destruction of the hit object into several pieces called debris; 2) by means of non-kinetic instruments, which result in the temporarily interruption of services of the satellite. This second option refers to the possibility to jam, block, distort, alter, a space product sensor or product, by using information warfare operations, particularly computer networks attacks. These methods do not cause the destruction of the satellite and, thus, do not end up in creating debris in orbit.
Attacks must not be limited to military objectives but also be 'proportionate'. The principle of 'proportionality' prohibits "*an attack which might 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*".[32] As far as attacks from space against terrestrial targets are concerned, there is no significant difference from attacks from somewhere else. Instead proportionality is extremely relevant to potential attacks in space: many space objects are dual and, irrespective of their military side, there would be collateral civilian damage which will result from the attack. A belligerent which is about to attack a satellite must, therefore, assess the expected collateral civilian damage resulting from it vis *à vis* the military advantage which it anticipates to gain. In this respect, two types of civilian collateral damage can be foreseen: 1) damage to civilians who benefit from the services provided by the attacked satellites; 2) damage to other civilian space objects caused by the debris generated by the destruction of the hit satellite.

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29 G.M. Goh, Keeping the peace in outer space: a legal framework for the prohibition of the use of force. 20 Space Policy 2004, 259.
30 Art. 49 (1), AP I.
31 For a discussion on this point see M. Schmitt, Wired warfare: computer network attack and international law, 84 Int'l Rev. of the Red Cross 2002, 365, 375-378.
32 Articles 51(5) and 57(2 and 5), AP I.

The issue of collateral damage in space is a particular sensitive one. For example, the US has adopted an approach aimed at minimizing collateral damage or incidental injuries to civilians caused during space related combat operations, in particular by selecting negating options (i.e. deception, disruption, denial, degradation, destruction).[33]

Several ways to avoid or limit collateral civilian damage can be described. Firstly, belligerents shall take care to avoid mistaken attacks, for example through accurate selection of targets, and shall take all possible precautions in the choice of means and methods of attack with a view of avoiding or, at least minimizing, harm to civilian or civilian objects.[34] In strike against space-based assets, the primary concern is the creation of debris.[35] Consequently, an attacker shall be required to use soft kill techniques, such as cyber attacks, rather than a kinetic strike, if the former result in less collateral damage while bringing a similar military advantage. This idea is also consistent with the provisions of Article IX of the Outer Space Treaty, assuming that this treaty is applicable in times of war. Article IX requires States Parties do not interfere or harm the right of other States to explore and use outer space. Clearly, the creation of dangerous debris in space may compromise the exercise of this rights and endanger the safety of other States' space assets. In any event, if a belligerent decide to attack a space object with a kinetic hit-to-kill weapons, it shall make sure that there are no civilians or civilian objects in the proximity of the selected targets, so as to create little risks to space objects other than the target itself, apart from the obvious creation of space debris. The precautions to be taken when attacking also include "*doing everything feasible to verify that the objective to be attacked are not . . . civilian objects*".[36] In this respect, the 1975 Registration Convention[37] may contribute to comply with this obligation, because it creates a degree of transparency as to the nature and identity of space-based objects. Furthermore, to be consistent with the requirement of taking precautionary measures, an attacker must carefully select the targets. Specifically, "*when a choice is possible between several military objectives for obtaining similar military advantage, the objective to be selected shall be that the attack on which may be expected to cause the least danger to civilian and to civilian objects*".[38] If this principle is applied to outer space, it can be said that when a satellite can be effectively neutralized through a strike on a ground-based control node in a remote area, it should not be permissible to attack the satellite kinetically and thereby creating dangerous space debris. Furthermore, not all parts of dual-use satellites are involved in the armed conflicts and the attackers should target only those

33 US Air Force, Transformation Flight Plan, 2004.
34 Art. 57 (2 a), AP I.
35 M. Benkö, The Problem of Space Debris: A Valid Case Against the Use of Aggressive Military Systems in Outer Space?, in (M. Benkö, K.U. Schrogl eds) *Essential Air and Space Law*, Eleven International Publishing, 2005.
36 *Ibid*.
37 Convention on Registration of Objects Launched into Outer Space, 1023 UNTS 15.
38 Art. 57 (3), AP I.

circuits or programs that are lawful targets, for example, the transmitters or bands in a communication satellite used by the military. This could be done by means of a cyber attack.

An interesting case which raises proportionality issues is an of attack against a space asset of military nature which also perform important civilian services. GPS is an example of this kind of space asset. The loss of the GPS signal would place civilian lives and property at great risk. These consequences shall be taken into serious account prior the attack. A more problematic case involve a space object owned and operated by a belligerent on which civilians, including foreigners, rely but which is also of value to the enemy. Again GPS is a good example. Can the US shut down components of the GPS system so as to deny their use to an opponent? Under IHL rules a belligerent cannot attack its own systems[39] and there is no requirement to operate any system for the benefit of civilian population. These rules extend to space-based assets.

With regard to the issue of collateral damage resulting from an attack against a space object, apart from those to civilian and civilian space objects, damage to the space environment must be analyzed.[40] IHL has concern for the protection of the environment in two ways 1) effects of warfare on the environment; 2) use of the environment as means of warfare. Article 35(3) and Article 55 of Additional Protocol I contain the most significant provisions for protection of the environment It is safe to assume that both provisions belong to the body of customary law. The place of Article 55(1) in the section on the protection of the civilian population on land may suggest its application being confined to land warfare. However, Article 35(3) is not so limited and, hence, the protection extends to all types of warfare, including space warfare. Article 35(3) states that "*it is prohibited to employ methods of warfare which are intended or may be expected to cause widespread, long-term and severe damage to the environment*". Article 35(3) focuses on the consequences on the environment of the use of any weapons, be a kinetic or direct-energy weapon, and it is thus applicable to sophisticated space weapons.[41] Additionally, the negative conditions resulting from the use of the weapon on the natural environment must be widespread, long-term, and severe. Clearly, debris generated by a strike against a space asset would result in long-lasting and widespread damage to the space environment, endangering the safety of space objects and jeopardizing the right of States to freely explore and use outer space. A further level of protection to the space environment in case of attacks against space assets is provided for in the 1977 ENMOD Convention.[42] The Convention is concerned with the deliberate manipulation of the natural process for military or hostile purposes.

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39 Art. 57, AP I.

40 See M. Schmitt, Green war: an assessment of the environmental law of armed conflicts, 22 Yale J. Int'l. L. 1997, 2.

41 M. Bourbonnière, National Security Law in Outer Space: The Interface of Exploration and Security, 70 J. Air & L. Comm. 2005, 3, 48-49.

42 Convention on the Prohibition of Military or any Other Hostile Use of Environmental Modification Techniques (ENMOD Convention).

It prohibits the hostile use of military Environmental Modification Techniques (EMT) and the use of technologies whose use would have "widespread, long-lasting, or severe effects". Importantly, the convention is limited only to "military or any other hostile use of environmental modification techniques".[43] The treaty is made explicitly applicable to outer space.

Beyond these general principles, a number of IHL rules may have an impact on space operations. For example, under customary IHL law, special protection is afforded to scientific entities.[44] Many space activities would qualify as such. Article 27 of the Annex to Hague IV, offers protection from intentional attack to building dedicated to science, provided that they are not being used at the time for military purposes.[45] This provision could be interpreted as offering additional protection to purely scientific satellites and their respective ground stations. Article 27 also requires belligerent States to make clearly visible the scientific nature of these buildings and to notify it to the enemy. Consequently, satellites and their architectures that are employed for scientific reasons must be adequately identified to benefit from this protected status.

A topic of particular importance in contemporary IHL is the participation of civilians in hostilities. This is a topic of special relevance in the space context, because military forces employ a significant number of civilians to conduct their operations and civilian space companies provide services to support military operations. Pursuant to Article 53(1) of Additional Protocol I "*civilians shall enjoy the protection afforded by this Section, unless and for such time as they take a direct part in the hostilities*".[46] This means that civilian that directly participate in an attack may theoretically be attacked. Consequently, the crucial factor to be assessed is what type of actions constitute direct participation. On this point there is no agreement in legal doctrine. Ultimately, it is the criticality of the act(s) in question to the direct application of violence against the enemy that determines its status as direct participation. Using this standard, many space operations conducted by civilians do not constitute direct participation. If one imagine a civilian programming an imagery satellite. This person has little idea how the product will be used and, that, it will be used for military purposes.

Furthermore, the implications of the principle of neutrality to space conflicts must be addressed. A neutral State is a State not participating in a conflict as one of the belligerent. In a conflict, a neutral State violates its duty of neutrality if , for example, gives satellite imagery to a belligerent. As described, under the law of neutrality nothing in the law of neutrality expressly requires a neutral State to prevent its citizens from aiding a belligerent. However, there is a significant difference when dealing with space assets. Under Article VI of the Outer

43 Art. I, 1977 ENMOD Convention.

44 M. Bourbonnière, *supra* footnote 41, p. 48.

45 Annex to the Convention Regulations Respecting the Law and Customs of War on Land (Oct. 18, 1908), reprinted in A. Roberts/R. Guelff eds.), *supra* footnote 22, p. 78.

46 This provision is also customary in nature. See J. Henckaerts & L. Doswald-Beck, *Customary International Humanitarian Law*, 2005, Rule 6.

Space Treaty, States are internationally responsible for the space activities of their nationals. Arguably, Article VI changes the general law of neutrality rule and, thus, a 'neutral State' should take steps to interrupt relations between its national and belligerents.

In conclusion, it can be argued that, while it is rather easy to consider space assets of military nature as 'legitimate military targets', the same cannot be said of dual-use space objects. Due to their dual nature, it is virtually impossible to establish an objective criteria to classify them as 'legitimate military targets', unless they are directly used in a military attack. Furthermore, in the event of an attack against space objects, accurate care should be taken to avoid or reduce collateral damage to civilians or civilian objects as well as to the space environment. This could be done by an appropriate selection of targets and means of warfare. In particular, States should make use of non-destructive weapons and, in any event, should follow a progressive approach which goes from the softer to the most destructive weapons. Essentially, States should make all efforts to make use of means which only temporarily interrupt the functionality of a space object, rather than making recourse of weapons causing long-lasting negative effects on civilians and the environment. And, even if a State decides to attack, the targeted space object should not be in the proximity of other space objects used for civilian purposes and, if possible, attacks should be focused on the ground facilities guiding a space objects rather than on the object itself. Special protection should also be given to scientific space assets and civilian not directly participating in an attack.

V The Way Forward: A *Jus in Bello Spatialis*?

In the previous sections, it has been described that specific rules to govern conflicts in space currently do not exist. The UN space treaties are not relevant in this respect because they are not meant to give direction in the event of a military confrontation in space. Guidance on how States should behave in a similar event can be found in the IHL rules and, in particular, in those included in the Additional Protocol I to the Geneva Convention. Although these rules were not developed to regulate conflicts in outer space, their applicability can in principle be extended to the outer space realm. This is indeed the exercise which has been attempted in the present paper. However, as long as no written and internationally agreed rules to regulate belligerents' activities in outer space are in place, a legal vacuum would exist and, consequently, the risk that military conflicts in space could be run in a unregulated way likely to be hazardous to civilian space objects as well as outer space broadly considered would exist.

Therefore, the present paper argues that the international community should undertake efforts to lay down the basic principles to govern armed conflicts in space, namely to develop the so-called *jus in bello spatialis* principles. This does not mean that a brand new branch of public international law should be created, as this would probably be an extremely long and likely un-successful undertaking. Instead, it is argued that, by using the existing IHL rules as a model and adapting them to the peculiar characteristics of outer space, specific

principles to regulate armed conflicts in space should be established. The questions would then be: 1) what should be the forum to negotiate these principles? 2) What legal status and form these principles should have?

As to the first point, it is suggested that *jus in bello spatialis* principles could be discussed and drafted in international forum dealing with conflict issue, such as the International Committee of the Red Cross or the United Nations Conference for Disarmament. The ICRC is an independent, neutral organization ensuring humanitarian protection and assistance for victims of armed conflict and other situations of violence.[47] Among its main tasks, the promotion as well as the drafting and codification of international humanitarian law rules have special significance. For example, it was on the ICRC's initiative that States adopted the original Geneva Convention of 1864 and the related Additional Protocols. Keeping this in mind it could be argued that the ICRC would be the most obvious forum for the negotiation of *jus in bello spatialis* rules. Although a similar undertaking does not appear in the ICRC's agenda at the moment, the expertise and the tradition of this organization in the field of international humanitarian law could lead it, also as a consequence of the request by States, to consider space law related issues. Alternatively, the Conference on Disarmament (CD) could be foreseen as possible forum to discuss *jus in bello spatialis* principles.[48] The CD, which is an international forum established to negotiate multilateral arms control and disarmament agreements, is actively involved in discussions and initiatives related to the prevention of weaponization of outer space.[49]

With regard to the second point, theoretically, it could be foreseen that these principles could be inserted in an instrument having either binding or non-binding nature. As to the former, it could take the form of an international treaty formally separated from the IHL framework or of an instrument linked to the IHL corpus of law. For example, *jus in bello spatialis* principles could be inserted in a new Protocol annexed to the Geneva Conventions. This suggestion stems from the fact that *jus in bello spatialis* principles would be largely based on the Geneva system rules. However, in case States were not immediately willing or interested to accept binding rules, an alternative option could be to include *jus in bello spatialis* principles in a non-binding instrument, such as a code of conduct. It would then be up to the States to comply with these principles or not. Anyway, a State could decided to make them binding at national level, i.e. on State organs or any subject under the jurisdiction of that particular State, by incorporating them into national defence and security strategies and policies to be complied with by the subjects falling under the jurisdiction of that particular State.

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47 For information on the International Committee of the Red Cross see <www.icrc.org/eng/what-we-do/other-activities/development-ihl/index.jsp>.

48 For information on the Conference on Disarmament see <www.unog.ch/80256EE600585943/(httpPages)/2D415EE45C5FAE07C12571800055232B?OpenDocument>.

49 In this respect see F. Tronchetti, Preventing the weaponization of outer space: is a Chinese-Russian-European common approach possible?, 27 Space Policy (2011) 81–88.

Regardless of the status chosen, *jus in bello spatialis* principles should have a flexible nature. As military confrontations have never occurred in outer space, it would be impossible to envision all relevant issues related to them and to laid down a comprehensive legal regime. States should then laid down the basic principles of *jus in bello spatialis*, such as those addressing targeting and proportionality issues, collateral damage, status of civilians, etc., leaving open the possibility to integrate them in a latter moment.

VI Conclusion

Space technologies have become crucial to the well being of modern societies and highly relevant in the context of military operations. As a consequence of these factors, it is not unlikely that, in the event serious international tensions, or even conflicts, States might consider space assets as valuable military item to be targeted. In simple terms, there is the risk that outer space might become a theatre of warfare.

Currently, international law does not contain specific rules regulating military confrontation in space. This absence creates uncertainty of the type of military actions allowed in the event of a conflict in space and the limits to be complied with by belligerents.

The present paper has suggested the development of a set of *jus in bello spatialis* principles based upon the existing rules of international humanitarian law. The setting up of these principles would represent an important step forward in enhancing security of space objects and safety of the space environment.