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## IS CURRENT INTERNATIONAL HUMANITARIAN LAW SUFFICIENT TO REGULATE A POTENTIAL CONFLICT IN OUTER SPACE?

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### ABSTRACT

In the world where we are becoming ever more reliant on space assets, the reality of outer space as a contested domain is one that is now a possible reality. The shift of key tools, such as military communications, into the space domain has significantly increased the potential military advantage of engagement in the outer space arena. Coupled with this, the rapid technological advances of the last 50 years has led to an expansion of the options for belligerent conduct in the space environment that are now, or will be soon, available.

The impacts of a space conflict have recently been given renewed prominence in light of the testing in 2007 of a kinetic anti-satellite weapon and the recent collision between the Iridium 33 and Cosmos 2251 satellites. Above all, the impact of space debris on space traffic, civil and military alike, has been highlighted as a concern for future space activities.

The debate as to whether or not outer space should remain un-weaponized and a preserve solely for peaceful uses is a polemic which often bogs down analysis on space regulation and stalls effective examination of the legal hypothetical of space conflict.

The paper closes by highlighting the value of attempting to close any such lacunae for the international policy perspective, highlighting the role of international law as a reflection of international policy.

### INTRODUCTION

In the debate over the regulation of the space environment, extensive thought, writings and rhetoric have been given over to the concept keeping space free for States to use for peaceful purposes. The elements of the five UN space treaties, especially the Outer Space Treaty of 1967<sup>1</sup>, are held up as the bastions of this approach. This however, does not provide a full picture for coherent analysis of the potential future needs of

the space environment. If the space debate is framed in the language of international humanitarian law (IHL) then the Outer Space Treaty and similar instruments focus on space in peace time and strive to prevent States going to war in space – i.e. implementing standards designed to vastly limit, if not remove all together, options open to States under the *jus ad bellum* banner. This leaves a significant gap in analysis in assessing what might be needed should a worst case scenario occur and conflict were to originate in, or spread to, the space environment. This paper aims to assess how the current doctrine and interpretation of the use of force and the concept of self-defence in international may be applied to space and if there may be further need for elucidation of existing law or a need to extend the current legal regime.

It is important to mention here that the oft-raised argument that discussion of the possible nature of space conflict and its legal regulation should be avoided as the very discussion of such topics provides legitimacy to possible conflict and increases the likelihood of such conflict occurring, is a position that is rejected by this paper. Not only does intellectual discussion of such a topic clearly outline the gravity of such an occurrence but also, should the worst occur, allows us as an international community to have considered how best to approach what can only be a politically, militarily and technical divisive situation.

### INTERNATIONAL LAW FOUNDATIONS

A common misconception of the space environment is that it exists in a political and legal vacuum removed from the mainstream of international relations. In reality, space relations are reflective of the global inter-relations of States. As such, the extensive body of law and custom that currently exists regulating the behaviour of States should provide context for all other discussions of the space environment especially when analysing a potential conflict.

A key concept that is central to international law is that of enforcement. Often, enforcement in international law is ascribed the characteristics of domestic law enforcement and thus is evaluated as insufficient. This is misleading. International law at its conceptual basis is the confluence of the desires and approaches of States. As such, there is no international “policeman” to act as an enforcer and no equivalent of an executive body to impose specific legal parameters. The equivalent of a Hobbesian social contract is established in international agreements such as the UN Charter through a direct acquiescence in the form of the signature and ratification to the Charter.

In space terms, this is particularly pertinent as it can be debated whether extensive custom has been created given the limited number of international actors in space and the limited time period in which those States have been engaged in space activities. When assessing space from the point of view of conflict, it is clear that no concept of war in space has yet been established and no treaties establishing specific *jus in bello* principles for space combat exist. There are many questions that arise when assessing general *jus in bello* principles and their applicability to space. For example, IHL would mandate that it applies in both the area where the hostilities actually take place as well as the broader areas that are in some way affected by the hostilities. If one were to consider the effects of an attack on a geo-stationary satellite which may relay a variety of signal to many States and regions, the scope of IHL when applied to space could be very extensive. The question then must be asked whether this is the most appropriate law and model to apply.

### THE USE OF FORCE AND ITS EXCEPTIONS

When thinking about a conflict in space and how the existing body of IHL may apply to it, the first starting point must be the international prohibition on the use of force. This prohibition, widely acknowledged to be customary international law<sup>2</sup>, is codified in Article 2(4) of the UN Charter,

‘All members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any State, or in any other manner inconsistent with the purposes of the United Nations’<sup>3</sup>

It would seem clear that this prohibition can be applied to the space environment as it has been widely interpreted to cover all elements of inter-State relations. There are two key exceptions to the use of force in the UN charter Chapter VII action mandated by the Security Council<sup>4</sup> and the right to self-defence. The latter is codified in article 51 of the UN Charter which states,

‘Nothing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a member of the United Nations...’<sup>5</sup>

Given this article what would a use of self-defence comprise of in the space arena and are there any elements that are specific to space to consider?

First is a question of definitions - what amounts to an armed attack in space? Do the thresholds we have seen established for an armed attack in a terrestrial context apply in space?<sup>6</sup> An interesting question on the cross-over of terrestrial concepts to space can be found in Article 3(d) of the Definition of Aggression<sup>7</sup> referring to marine and air fleets of another State. “Fleets” was expressly included to exclude the use of force against a single or a few commercial vessels. Could such a principle in theory, preclude an attack on one commercial satellite as reaching the necessary threshold for invoking self-defence?

The conceptualisation of the right of self defence as it is laid out in Article 51 of the UN Charter does not specifically mention the conditions under which the right can be exercised. However, four key principles of IHL theory would seem most relevant to an analysis of a conflict in space and the exercise of the use of force and can be considered to be customary international law. These are the principles of proportionality, distinction, necessity and immediacy. The tenets of these principles highlight some of the key questions that might arise in assessing an example of the use of the force in self defence in that space context.

#### 1. The Principle of Necessity

The principle of necessity can be broken down into three key elements the obligation of a State to establish beyond doubt that the armed attack in question was launched by a particular State; that the use of force amounted to an armed attack and

that such an attack was specifically directed against the injured State and lastly that there is no other option but to retaliate, at that time, with force.<sup>8</sup> In the space context the questions of attribution are particularly difficult and are dealt with below in further detail. The issue of the resort to retaliatory force and how force is used is also particularly relevant to the space environment. Given the unique physical properties of space, retaliation, for example, the destruction of satellite B of State Y in response to the destruction of satellite A of State X may have a disproportionate impact on other space actors. As such, the necessity of carry out reprisals in the space environment as opposed to in a terrestrial context would need to very carefully assessed.

## 2. The Principle of Distinction

The principle of distinction encapsulates the international customary rule that when employing the use of force actors must differentiate between military and civilian objectives. This is of particular relevance in the space environment given the number civilian assets that carry military traffic – dual use assets. In addition, an attack against a military objective can still be considered unlawful if the collateral damage to civilian assets is excessive.<sup>9</sup> In the unique conditions of the space environment, the debris resulting from the intentional destruction of a satellite could arguably be said to meet that threshold, especially if it is in a particularly congested orbit such sun-synchronous orbit (SSO).

## 3. The Principle of Proportionality

The question of a proportional response in space either to a terrestrial threat or to a threat in outer space is of utmost significance. Proportionality “is the quintessential factor in appraising the legitimacy of the counter-measures executed by the responding State [in a case of the exercise of self defence]”<sup>10</sup> In both the International Court of Justice’s Advisory Opinion on the legality of the threat or use of nuclear weapons<sup>11</sup> and the Nicaragua case<sup>12</sup> it was stated that proportionality was a well established principle in customary international law. Given current concerns about the fragility of the orbital environment, the threat of orbital debris and the risk it poses to the long-term sustainability of space activities for all States, assessing what might constitute a proportional response in space is key. There are several issues however, with the space environment that make

elements of the bases of the principle hard to establish – one of the most interesting, linked also the principle of distinction, is how do you quantify the loss of space services and resources to a sector of the world’s population? From health to helicopters, weather to wheat, space is an integral part of many essential and non-essential services utilised by people from a myriad of different States. If a communications satellite carrying both military traffic and disaster relief information is disabled, how do we quantify the extent of the civilian collateral damage? Is this a proportional response or would a terrestrial reprisal scenario have been more in keeping with IHL principles?

## 4. The Principle of Immediacy

The principle of immediacy requires that time period between an armed attack and the exercise of self defence not be excessive. In the space context this may prove of concern given the time delay in ascertaining whether an armed attack has taken place and the result complications of attribution.

## WHAT DO SPACE WEAPON THREATS LOOK LIKE?

In light of the principle of the prohibition of the use of force and the above four key principles of international humanitarian law, what do the kind of threats that might to have to be assessed look like? When looking at future regulation of potential space conflict, there is a need to look at what kind of weapons are currently in existence that may be used as military threats to space objects and to those which will be developed in the future. Currently the draft treaty on the prevention of the placement of weapons in outer space, the threat or use of force against outer space objects, commonly known as the PPWT, put forward by the governments of the Russian Federation and the People’s Republic of China at the Conference on Disarmament<sup>13</sup> defines a space weapon as a system which

“any device placed in outer space, based on any physical principle, specially produced or converted to eliminate, damage or disrupt normal function of objects in outer space, on the Earth or in its air, as well as to eliminate population, components of biosphere critical to human

existence or inflict damage to them”<sup>14</sup>

and it is “placed” in space, “if it orbits the Earth at least once, or follows a section of such an orbit before leaving this orbit, or is stationed on a permanent basis somewhere in outer space”<sup>15</sup> This is however, only one group of space weapons. The treaty itself focuses predominantly on weapons that are *in space* not those that can comprehensively *affect* space objects. There are many other systems such as ground-based lasers and direct ascent kinetic anti-satellite weapons (ASATs). The draft treaty attempts to deal with these systems through reference to the general prohibition of the use of force.<sup>16</sup> This however, may be an approach fraught with pitfalls. Two key aspects that should be considered when examining weapons systems that may threaten space assets are the ability to identify that an armed attack has occurred and second, the ease of attributing that armed attack to a specific actor. Taking four weapons possibilities, direct ascent ASATs, Co-orbital ASATs, jammers and lasers, these criteria are assessed below.

### 1. Direct Ascent ASATs

Direct ascent ASATs are missiles launched from the ground at a satellite. In the context of the PPWT, such systems are only covered by the general principle of the prohibition of the use of force and not by the specifics of the draft treaty as from the physical point of view, they do not meet the requirements of the PPWT as they are at no point in orbit. See diagram 1 below.

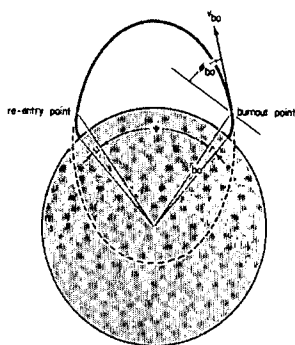


Diagram 1<sup>17</sup>

It is relatively easy to identify that an armed attack has taken place as both the launch of the ASAT can be detected using infra-red satellites and the successful attack can be identified as a satellite will stop transmitting and a new space debris cloud will have been created. As regards attributing the attack to a specific source, as a ground-to-satellite interceptor flies on a relatively short ballistic arc lasting around fifteen minutes from the moment of launch to the targeted satellite, one can determine

where the ASAT was launched from with relative accuracy.

### 2. Co-Orbital ASAT

A co-orbital ASAT is an object on orbit that rendezvouses with another satellite and disables or destroys it. In terms of identification of whether an armed attack has occurred, existing updated catalogues of space objects, such as that maintained by the US military, can be used to detect manoeuvres by an object in the catalogue to a new orbital trajectory and then conjunction assessments with a supposed target can be calculated. As regards attribution of such an attack to a particular actor, this can be significantly more complicated. A co-orbital interceptor may be dormant for a very long time before it is activated. As such it may be labelled as debris or not catalogued at all. The catalogues are far from exhaustive and no catalogue updates all objects continuously. As a result, it may be difficult to determine the origin of the launch of such an object. Additional complications may result from such an object having previously been attached to a larger satellite or rocket body and after a period of time separated and manoeuvred away.

### 3. Jammers

Jammers are systems that block the transmission of signals to or from a space object. Identification of an attack can in theory be easy as one loses the ability to communicate with a satellite. However, it is often hard to determine whether the loss of the ability to communicate with a satellite is result of human interference or another technical or weather issue. This question is sometimes made easier through the detection of a jamming signal being reflected off the satellite or overlapping onto nearby satellites. Once one has identified that a satellite is being jammed it is fairly easy to narrow down the area in which the jamming is originating to a few hundred kilometres. It is however, hard to identify the exact source especially as jammers can be mobile. In addition, with this level of technology there are questions as to whether the jamming is being carried out by a State or a non-State actor.

### 4. Lasers

Lasers can be used to impair or disable satellite sensors, especially in the case of remote sensing satellites. Identification that an armed attack has occurred can be difficult, especially if a laser takes out a satellite quickly. If a satellite stops responding immediately after flying over a known fixed laser site then it is logical to consider an attack but one cannot verify this. In future, the concept of a mobile laser, similar to that of mobile jammers, which is not yet currently in existence,

may be a further complication. As regards attribution, a lasing source would have to be directly in the footprint of a satellite to damage its optical sensors – i.e. the satellite must be directly “looking” at the laser’s origin. Similar concerns come into play as regards fixed and mobile jammers – would such a facility be operated by a State or by a non-State actor?

Overall, this brief, and far from comprehensive, analysis demonstrates that the use of force in space as an exercise of self-defence is potentially fraught with difficulties. The nature of current space weaponry means that fulfilling two conditions of the IHL principle of necessity, namely, clear attribution and establishment of armed attack, may be a very difficult challenge. There are many concerns with our abilities in many circumstances to determine whether an armed attack has actually occurred and who may be responsible for it and as such, relying on the general prohibition of the use of force and its accompanying principles arguably may not suffice in the long-term.

### CONCLUSIONS

When thinking about a potential conflict in the space environment and the use of force in space, the impacts are very different from those in terrestrial scenarios. The loss of space resources in sections of the global population dependent on one satellite on the one hand and the polluting of the space environment with orbital debris resulting from space conflict with a potential catastrophic loss of all space resources for all actors are unique and hard to quantify when assessing proportionality and necessity.

At the current time, there is a need to begin political and legal discussion on how we accommodate the unique physical properties and our levels of knowledge of the space environment into pragmatic and effective progressive development of IHL. If the international community were to find itself in a conflict situation legal parameters, as we have seen in many other arenas, are of paramount importance. Referring back to the question posed at the beginning of this paper, is current IHL sufficient to regulate a potential space conflict, the answer would seem to be unclear. Until definitions have been clearly defined by the international community and the proverbial “lines in the sand” have been established to denote acceptable and non-acceptable behavior of States in the space environment, the direct applicability of many aspects of IHL would still seem untenable. What can be said however, is that

there is a clear need for further knowledge and transparency in the space environment. Programmes such as global space situational awareness – knowing what is up there and where it is going – will vastly enhance the predictability of the space environment and, in the long run, will aid legal and political clarity and thus stability on the interaction of actors in this most multilateral of environments.

<sup>1</sup> Outer Space Treaty, United Nations General Assembly, 21st Session. *Resolution 2222 (1967)* 27 January 1967

<sup>2</sup> See Case Concerning Military and Paramilitary Activities in and against Nicaragua (Merits) [1986], *ICJ Reports* 14

<sup>3</sup> United Nations, *Charter of the United Nations*, 24 October 1945, Chapter II, Article 2(4)

<sup>4</sup> United Nations, *Charter of the United Nations*, 24 October 1945, Chapter VII, Article 42

<sup>5</sup> United Nations, *Charter of the United Nations*, 24 October 1945, Chapter VII, Article 51

<sup>6</sup> See Case Concerning Military and Paramilitary Activities in and against Nicaragua (Merits) [1986], *ICJ Reports* 14

<sup>7</sup> UNGA Resolution on Definition of Aggression, United Nations General Assembly *Resolution 3314* 14 December 1974

<sup>8</sup> See Case Concerning Oil Platforms, 2003, 42 *ILM* 1334

<sup>9</sup> See Sassioli, M., “Legitimate Targets of Attacks Under International Humanitarian Law”, *Background Paper prepared for the Informal High-Level Expert Meeting on the Reaffirmation and Development of International Humanitarian Law*, Cambridge, January 27-29, 2003 available at [www.ihlresearch.org/ihl/pdfs/Session1.pdf](http://www.ihlresearch.org/ihl/pdfs/Session1.pdf) accessed 8<sup>th</sup> September 2009

<sup>10</sup> Dinstein, Y. *War Aggression and Self Defence* 4<sup>th</sup> Ed., (CUP: Cambridge, 2005), p.224

<sup>11</sup> Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons [1996] *ICJ Reports* 226, at para. 245

<sup>12</sup> Case Concerning Military and Paramilitary Activities in and against Nicaragua (Merits) [1986], *ICJ Reports* 14 at para. 94

<sup>13</sup> Draft treaty on the prevention of the placement of weapons in outer space, the threat or use of force against outer space objects, UN Do. CD/1839, 29<sup>th</sup> February 2008,

<sup>14</sup> Draft treaty on the prevention of the placement of weapons in outer space, the threat or use of force against outer space objects, UN Do. CD/1839, 29<sup>th</sup> February 2008, Article 1(c)

<sup>15</sup> Draft treaty on the prevention of the placement of weapons in outer space, the threat or use of force

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against outer space objects, UN Do. CD/1839, 29<sup>th</sup> February 2008, Article 1(d)

<sup>16</sup>See the responses of the governments of the Russian Federation and the People's Republic of China to the questions of the international community on the Draft Treaty - "Letter dated 18<sup>th</sup> August 2009 from the Permanent Representative of China and the Permanent Representative of the Russian Federation to the Conference on Disarmament addressed to the Secretary-General of the Conference transmitting answers to the principle questions and comments on the draft "Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT)" introduced by the Russian Federation and China and issued as Document CD/1839 dated 29 February 2008", UN Doc. CD/1872, 18 August 2009

<sup>17</sup> Bate R., Mueller, D. & White, J, *Fundamentals of Astrodynamics* (USA, 1979)