



Promoting Cooperative Solutions for Space Sustainability

Scenario Workshop on Exploring Self-Defense in Space Summary Report

29 October 2015

Secure World Foundation

ABOUT SECURE WORLD FOUNDATION

SWF is a private, endowed operating foundation dedicated to the secure and sustainable use of space for the benefit of Earth and all its peoples. SWF works with governments, industry, international organizations, and civil society to develop and promote ideas and actions for international collaboration that achieve the secure, sustainable, and peaceful uses of outer space.

EXECUTIVE SUMMARY

The topic of self-defense in space has recently become an important issue in the broader international discussion of space security and sustainability. Some countries have argued that current space security and sustainability initiatives cannot move forward until self-defense has been successfully defined by the international community, while there are others who would prefer it remain undefined. Still others argue that there can be no self-defense in space because it violates the principle of peaceful purposes.

On September 9, 2015, Secure World Foundation (SWF) and the George Washington University's Space Policy Institute (SPI), convened a workshop in Washington, D.C., to bring together experts from academia, international organizations, non-governmental organizations, and the public sector to consider and discuss three hypothetical scenarios on self-defense and conflict in outer space.

The participants walked through each scenario and then had a moderated discussion of the various issues and challenges. The issues covered by the scenarios included deliberate interference with satellites, legal and policy options for responding to interference, military payloads hosted on commercial satellites, pre-emptive self-defense, targeting, cross-domain proportionality, intentional creation of space debris and damage to third parties, liability, and hybrid warfare.

The participants concluded that much more analysis needed to be done to understand all the legal, political, and operational nuances of the issue of self-defense in space. They concluded that there was generally a lack of clarity and consensus on the meaning of existing principles in international space law, the lack of existing legal and political mechanisms for resolving situations without use of force, the overall inexperience of the military space world in dealing with *jus ad bellum* and *jus in bello*, and the lack of expertise and capacity to grapple with these issues within the international community. Some felt that the experience highlighted the importance of international discussions on norms of behavior and perhaps even new legal agreements, although most cautioned that much more work would be required to increase understanding and build consensus before meaningful discussions were possible.

The workshop participants generally agreed that the core challenge is the novelty of the topic of self-defense and armed conflict in the context of the space domain. The major question is whether it will take decades or centuries of conflict in space and cyber to develop similar laws, or if there are lessons that can be drawn from older domains that are applicable to the new that can speed up the process. From the perspective of SWF, the goal of such a process should be similar to that in other domains – reducing the chances of military conflict, and ensuring that conflict does not have an adverse impact on third parties, commercial and civil actors, and the long-term sustainable use of the space domain.

INTRODUCTION

Concerns about space as a domain for potential military conflict are increasing. Issues such as the use of force, armed attack, resiliency, and self-defense in outer space are being discussed with greater frequency and urgency in various fora. Conversations on the national and international level, including in regularly-held committees like the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and in *ad hoc* sessions and conferences where disarmament and the military uses of space are discussed, all demonstrate the increasing salience of this topic.

The debate on these issues reveals a divergence of views and a paucity of open discussions of the complicated and interlinked concepts of space security, sustainability, and the potential for conflict in space. Some see outer space as a sanctuary, where the use and exploration of outer space is the province of all humankind, and where space activities can only be conducted for peaceful purposes. Others are concerned that the growing use of space for national security purposes could lead to attacks on space systems as part of future conflicts on Earth.

To explore these issues, SWF, in collaboration with George Washington University's Space Policy Institute (SPI), convened a workshop on September 9, 2015, in Washington, D.C., comprised of experts from academia, international organizations, non-governmental organizations, and the public sector to consider and discuss three hypothetical yet plausible scenarios exploring issues of self-defense and conflict in outer space.

This workshop was held under Chatham House Rule and was not for attribution. The views expressed in this summary report do not necessarily reflect those of Secure World Foundation, Space Policy Institute, nor of the individuals in attendance or their respective institutions, organization, or governments.

SCENARIO 1 - COMMERCIAL SATELLITE OPERATORS, HOSTED PAYLOADS, AND PRE-EMPTION

Country A utilizes commercial satellite services for military purposes. It has two major satellite contracts. One contract is with International Satellite Broadband Service (ISBS), a satellite communications provider headquartered in Country B, to host transponders for Country A's military on its commercial communications satellites. The transponders are used to route intelligence, reconnaissance, and surveillance (ISR) data between Country A's UAVs and its military ground networks. A second contract is with EagleEye Global, a remote sensing company headquartered in Country A, for commercial satellite imagery.

During a period of increased tensions between Country A and Country Z, ISBS reports to Country A that two of its satellites with hosted military payloads, located on the geostationary belt with coverage over Country Z, are experiencing uplink jamming that is preventing Country Z from issuing commands to those satellites. The satellites are beginning to drift out of their assigned geostationary slots, and as a result, its customers are having trouble maintaining connectivity. Country A is also having trouble maintaining links to its hosted transponders on those satellites, and its ISR capabilities in the region are degraded. ISBS has evidence to suggest that the jamming is ground-based and coming from Country Z. ISBS asks Country A for assistance in resolving the jamming.

Questions to consider:

- Does uplink jamming that prevents command and control of a satellite and degrades military capability constitute an armed attack?
- What is the role of Country B in this scenario?
- Can Country A legally use force to destroy the jamming sites? Under what restrictions?
- What is the role of the International Telecommunication Union (ITU) in this scenario?

Further scenario developments

After tensions escalate further between Country A and Country Z, Country Z uses ground-based kinetic interceptors to attack and destroy three of EagleEye Global's satellites. Country Z states that it was acting in self-defense, and had intelligence indicating that Country A was using imagery from the EagleEye satellites to target preemptive attacks on Country Z's facilities.

Further questions to consider:

- What is the legal standard for a pre-emptive attack on satellites in self-defense?
- Does the attack on EagleEye's satellites constitute an armed attack on Country Z?
- What constitutes a proportional response by Country A?

Moderated discussion - Lead by Brian Weeden, Technical Advisor, SWF

The participants in the workshop considered the scenario and options that states A and B might take, focusing on their legal context, and their resulting potential military and political consequences. Assuming that the offending activity was indeed ground-based uplink jamming from Country Z, this activity arguably falls within a spectrum of impermissible actions that violate international law. At the general level of international state responsibility, the violation of an international obligation which is attributable to a state is said to constitute an internationally wrongful act.¹ Relevant international obligations might be found in treaties such as the Outer Space Treaty (OST), or the Convention, Constitution, and Radio Regulations of the International Telecommunication Union (ITU). Obligations might also be found in customary international law, or determined from general principles of international law. An internationally wrongful act entails the international responsibility of the attributable state, requiring cessation, non-repetition, and full reparation for injuries caused from the act.² There are circumstances in which the suffering state can permissibly respond with internationally wrongful acts of its own, although retaliation is not the purpose.³ However, there are considerations concerning proportionality and related issues,⁴ countermeasures must focus on bringing the attributable state back into compliance (rather than ‘retaliation’). There are also other appropriate means to seek redress.

At a heightened level of seriousness, if the actions constitutes a use of force (or even the threat of the use of force), such actions are broadly and uniformly prohibited by the Charter of the United Nations, whose Article 2.4 has the effect of prohibiting aggressive war, and which has been the fallback position of the international legal order for over 70 years.⁵

At the highest level of seriousness is the “armed attack”, which is not only prohibited by Article 2.4 of the United Nations Charter, but which triggers Chapter 7 of the Charter, permitting either

¹ Responsibility of States for Internationally Wrongful Acts, G.A. Res. 56/83, Annex, U.N. Doc. A/RES/56/83/Annex (Dec. 12, 2001) *available at* http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/56/83. Responsibility of States for Internationally Wrongful Acts, G.A. Res. 59/35, U.N. Doc. A/RES/59/35 (Dec. 2, 2004) *available at* http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/59/35 [hereinafter Draft Articles on State Responsibility]. Established in 1947 by the United Nations General Assembly, the International Law Commission (ILC) promotes the progressive development and codification of international law. Collectively representing the world’s principal legal systems, the ILC prepares drafts on aspects of international law either referred to it by the General Assembly or chosen by itself. *See* Shabtai Rosenne, State Responsibility: Festina Lente, 75 Brit. Y.B Int’l L. 363, 371 (2004) (a short history of the ILC Draft Articles on State Responsibility).

² Draft Articles on State Responsibility, *supra* note 2, at art. 30, 31.

³ *Id.*, art. 51.

⁴ *Id.*, Chapter II - Countermeasures.

⁵ U.N. Charter art. 2.4 (“All Members shall refrain in their international relations from the threat of force 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.”).

individual or collective self-defense until the United Nations Security Council has taken measures necessary to maintain international peace and security. Distinctions between the merely illegal “use of force” and an “armed attack” have been discussed by international jurisprudence, where “armed attack” is thought to be of a graver nature.⁶

It was additionally noted that various legal regimes are generally implicated by this scenario. *Jus ad bellum* is concerned with the legality or justification for resorting to force. Whether the use of force is justified or not, *jus in bello*, sometimes referred to as International Humanitarian Law (IHL) or the Law of Armed Conflict (LOAC), is the set of rules pertaining to activities during an armed conflict.

Participants noted that absent additional aggravating circumstances, uplink jamming may constitute merely an inconvenience or irritation, rather than a use of force (and much less an armed attack as envisaged under Article 51 of the UN Charter). Neither the ability to command and control a satellite nor the lost services by themselves would necessarily amount to a hostile action. However, during tensions, preparation of the battlefield prior to initiating military action, such as degrading a foreign state’s military capacity, may amount to a use of force or armed attack. In either case, several participants noted that the legal issues should not be seen as requiring a certain burden of proof but rather available information will inform the choice of a course of action by decision-makers.

One participant noted that the United States’ view is that use of force and armed attack are essentially the same thing. This perspective is not shared widely and international jurisprudence differentiates between use of force and an armed attack, with the latter being limited to the most grave forms of the use of force.⁷

Moving onto responses, participants noted that Country B seems to be the state internationally responsible for the ISBS satellites (as part of its national space activities), while both countries A and B are suffering harm (with B having its military ISR capabilities degraded). ISBS lacks clear legal avenues to pursue an end of the jamming. As a non-governmental entity, ISBS’s options are limited to either bringing political or economic pressure on Country Z, or turning to another state for help. While both Country A and Country B were potentially harmed, Country B (as the headquarters of ISBS) would have to lead since, under article 6 of the OST it is responsible for its national activities in space. Whether or not Country B would come to ISBS’s aid would likely be determined by the specifics of the license Country B issued to ISBS.

On a diplomatic level, Country A and or B might consider bringing the issue of jamming to the International Telecommunication Union (ITU), an international intergovernmental organization

⁶ Oil Platforms (Islamic Republic of Iran v. US) 203 ICJ Rep. 161, and the Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. US), ICJ Reports 392 (1986).

⁷ Ibid.,

under the UN system whose mission is ensuring the rational, equitable, efficient and economical use of the radio-frequency spectrum and of the geostationary orbit. In the ITU regime, harmful interference is defined, but not subdivided into intentional or unintentional interference.⁸ Harmful interference is addressed in Article 45 of the ITU Constitution, and requires that “all stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other Member States or recognized operating agencies...”⁹

As a treaty obligation binding upon all 193 Member States of the ITU, the violation of this obligation attributable to any state seems akin to the perpetration of an internationally wrongful act. Country B might bring the issue to the attention of the ITU, whose Radiocommunication Bureau (BR) and Radio Regulations Board (RRB) may make investigations and prepare a report confirming the interference. Dispute mechanisms exist within the ITU under Article 56, but participants seemed to agree that the ITU lacks enforcement power.¹⁰

Participants also considered the scenario under space law, where Article 6 of the OST requires authorization, licensing, and continuing supervision of national activities. On the national level, these obligations imply that a domestic legal regime may have provisions creating regulatory or contractual recourse for satellite customers suffering from interference. As ISBS is a corporate citizen of Country B, with A as the customer, some mitigation or compensatory remedy of the effects between them may be possible. Additionally, as the facts indicate that fuel may need to be expended to recover the ISBS satellites, this extra use of fuel indicates a permanent degradation of the operational lifespan of the satellites, and the performance of the contract by ISBS is negatively impacted. Is ISBS now liable for lost services and lost profits to Country A and other customers using its commercial satellites?

While the international space law regime addresses damage, liability under space law is for physical damage only, and not for merely economic loss. Consequently, the liability provisions are probably not activated for this uplink jamming. Elsewhere, the “due regard” clause in Article 9 of the OST (which requires parties to the OST to act with due regard to other state parties’

⁸ ITU, *Radio Regulations*, (“1.166 *interference*: The effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunication system, manifested by any performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy”). *See also* 1.169 (“*harmful interference*: Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with these Regulations.”).

⁹ International Telecommunication Constitution, Dec. 22, 1992, 2133 U.N.T.S. 331, at art. 45.

¹⁰ *See also* Institute Francis Relations Internationals, *Governing the Geostationary Orbit - Orbital Slots and Spectrum Use in an Era of Interference*, Note de l’Ifri, Jan. 2014, available at <http://www.ifri.org/en/publications/enotes/notes-de-lifri/governing-geostationary-orbit-orbital-slots-and-spectrum-use-era>.

interests) could be used to argue that Country Z is interfering with Country A and Country B's legal right to use space in a peaceable manner. Article 9 also involves an obligation to consult, but participants admitted that there were questions over whether any country has ever invoked Article 9 in this context, that due regard remained a nebulous concept insufficiently defined, and that the level of proof required for these legal determinations was also problematic. Additionally, the violation of these treaty obligations might constitute an internationally wrongful act, but does not rise to the level of a use of force.

Recourse to the International Court of Justice (ICJ), the principal judicial organ of the United Nations, was also discussed as a peaceful method to settle the dispute, but the jurisdiction of the ICJ is contingent upon the agreement of the states.¹¹ While the ICJ offers advisory opinions,¹² adjudication between states before the ICJ might be unlikely.

While Country A has its military ISR capabilities imperiled and diminished, it must be remembered that if it were to act in self-defense, such an action establishes a state of armed conflict. Under the law of armed conflict, responses must be proportional and must distinguish between permissible and non-permissible targets, i.e. between military objectives and civilian objects. The option to respond to the ground station doing the jamming might seem attractive from a tactical standpoint as being both discreet and deniable. However, if the jamming is merely a violation of an international obligation, and not an impermissible use of force, then the use of force as a response would likely be deemed an excessive response.

Unilateral and multilateral means to respond to the jamming include the normal political steps ranging from unilateral and/or multilateral sanctions, international blaming and ostracism, loss of favored nation status and other economic and/or political steps outside the space arena, UN General Assembly resolutions, and Security Council resolutions and collective measures. However, participants noted that those countermeasures cannot include negative effects on a third state. Participants from the policy field made clear that any international narrative (based on legal arguments discussed above) will follow from what political leaders want to pursue, and an issue like jamming necessarily falls under a broader geopolitical discussion, and the domestic political posture.

There was also a significant point made about the challenge in making an effective decision. There will be differences between the intended effects, the actual effects, and the resulting impact. Each country likely has different information about the situation, which impacts their understanding and perception. In addition, each country's own history, culture, ideology also creates a context that likely impacts their understanding in a different way from other countries.

Stepping further away from the details of the scenario, participants mused on the interplay of law, policy, and justice, all of which work together to establish legitimacy. If the issue is raised

¹¹ Statute of the International Court of Justice, *supra* note 2, at Chapter II - Competence of the Court.

¹² Statute of the International Court of Justice, *supra* note 2, at Chapter IV - Advisory Opinions.

domestically or internationally by Country A or B, they will have to consider how to sway public and international opinion and determine legitimacy. Some participants reflected that relying on a low legal standard for a use of force might undermine a state's legitimacy, while a higher legal standard is better for a state's legitimacy argument both domestically and internationally.

As the scenario progressed, the discussion shifted to the definitions of pre-emptive, anticipatory, and preventive self-defense, and while these terms are often used interchangeably, in legal terms they are different. Participants agreed that the well-established standard on the use of force by States, reflecting long traditions of customary international law, is both valid and applicable to the present case. The test reflected in the *Caroline* case states that lawful recourse to self-defense requires “*a necessity of self-defence, instant, overwhelming, leaving no choice of means, and no moment for deliberation [and involving] nothing unreasonable or excessive; since the act, justified by the necessity of self-defence, must be limited to that necessity, and kept clearly within it.*”¹³ With this definition, participants agreed that the scenario definition does not appear to meet the standard for anticipatory self-defense.

From a policy perspective and concerned with pragmatic actions, participants admitted that there is a reticence by states to clearly and definitively define which acts are clearly legitimate uses of force, as clear distinctions can be seen as potentially limiting their future range of options. Further exploring the pragmatic and operational route that scenarios such as this would create, the view was expressed that operational lawyers within military hierarchies will be asked to advise on the legal risks incumbent in actions that their commanders see as operationally advantageous. As such, a lack of definitions can lead to more options, and the view was expressed that just because there is a particular threshold of a response that a state *would* be justified to use, that does not mean that they must use that response. One participant noted that the grey area created by the various options is a lawyer's friend, and states can choose to respond at a lower level, or not respond at all.

Nevertheless, issues of scale and effect, consequences, and attribution clearly and fundamentally inform the steps that actors will execute. The discussion of Scenario 1 concluded with the participants seeing it as a tense scenario where mistrust, misperceptions, and miscalculations could easily unravel into a situation of open conflict between states, and that definitive information and space situational awareness are absolutely essential to operators in managing and preventing such scenarios. In the end, the discussion of Scenario 1 concluded that this scenario highlights the lack of international mechanisms to resolve intentional jamming situations, and ruminations on whether

¹³ Anthony Aust, *Handbook of International Law* 209-210 (2nd ed. 2010) (“These criteria were subsequently developed to be more in tune with the realities of international life, where there is usually a choice of means and some time for deliberation... to be a lawful exercise of the right of self-defense the threat or use of force must be: [1] In response to an imminent armed attack...; [2] Necessary...; [3] Limited to the immediate purposes...; [3] Reasonable and proportionate to the threat or the force used against it.”).

the United States or other countries should develop initiatives to create new institutional, legal, or political mechanisms to address some of these shortcomings.

SCENARIO 2 - THRESHOLD FOR ARMED ATTACK AND CROSS-DOMAIN PROPORTIONALITY

Country B has significant space-based capabilities that are used to augment its military power. These include space-based missile warning, targeting and tracking to support missile defense, extensive space-based ISR, and a space-based kinetic weapons system that can attack targets on the ground. Country C has some space-based capabilities, but much less relative to Country B. Country C has limited space-based ISR that is primarily used to target conventional ballistic missiles. Both countries are involved in a crisis over control of offshore resources. Tensions between Country B and C increase to the point where armed conflict is considered likely.

Country B begins to experience anomalies with two of its low Earth orbit (LEO) satellites that are part of its missile detection and tracking system. The satellites are still functional, but are experiencing power losses that have degraded their capabilities. Further investigation indicates that they recently passed over a suspected ground-based laser weapons installation in Country C. However, an alternative analysis indicates that there may have been a previously unknown manufacturing defect in their solar panels. Orbital analysis shows that several more of Country B's tracking satellites will be passing over the suspected laser installation over the next couple of days. The suspected laser ground station is located inside Country C's borders and in the middle of an urban area.

Policymakers in Country B are contemplating a list of options for response:

1. Issuing a demarche to Country C for purposeful interference with Country B's satellites in violation of the OST and demanding damages under the Liability Convention
2. Using ground-based cyber capabilities to disable several of Country C's ISR satellites that are used to target its ballistic missiles
3. Using a hypersonic missile to attack the laser ground station

Questions to consider

- What is the burden of proof for Country B to demonstrate that Country C is responsible for damage to its satellites?
- What legal remedies would Country B have to respond to what might be an internationally wrongful act?
- Does Country C's purported laser attack on Country B's satellites constitute an armed attack?
- Is destroying the ground facility a proportional response to attacks on Country B's satellites?

Further scenario developments

Tensions escalate to the point where armed conflict occurs. Country B and Country C are actively exchanging fire between their air and maritime forces. Country C fires a salvo of mobile, conventionally-armed ballistic missiles at one of Country B's air bases, located near an urban population. As a result of the degraded tracking and targeting capabilities, Country B's missile defense system is only partially successful in intercepting the incoming warheads. Several have their trajectory altered by near misses from interceptors and land in the urban area, causing significant casualties.

The military leadership of Country B has determined that it is too difficult to locate and destroy the remainder of Country C's mobile ballistic missiles. Instead, they are urging use of its space-based kinetic weapons system to attack military and leadership targets in Country C in order to deter it from launching additional ballistic missiles. Several of these targets are located in or near urban populations

A further question to consider

What are Country B's considerations for military necessity, proportionality, and distinction in weighing its response options?

Moderated discussion - Lead by Scott Pace, Director, SPI

The discussion of Scenario 2 began with a review of legal characterization of Country C's interference with Country B's satellites, especially what constitutes an internationally wrongful act. An internationally wrongful act is an act that is 1) attributable to a state under international law, and 2) constitutes a breach of an international obligation of that state.¹⁴ A breach by one state creates international legal consequences for that state, and permits countermeasures by the injured state.¹⁵

Moving onto responses, participants noted that the lack of information made it very difficult to determine which options were "right". Some participants argued that Country B's military would be very reluctant to demarche, because it would confirm to Country C that the attack worked. They emphasized that if Country B is having trouble determining what happened, then Country C is probably having trouble knowing whether the attack worked. They also said that it would be far more difficult to demarche over an incident with a covert military capability as opposed to an acknowledged one. Others noted that a demarche might put additional political pressure on Country C, and provide a way to signal to Country C without being deliberately escalatory. One participant noted that context is everything, and that the rhetoric, history, and any on-going

¹⁴ Draft Articles on State Responsibility, *supra* note 2, at art. 1.

¹⁵ Draft Articles on State Responsibility, *supra* note 2, at Part Two - Content of the International Responsibility of a State, and Part III, Chapter II - Countermeasures.

dispute(s) between Country B and Country C needed to be taken into account. Others asked how each option might affect the crisis and the potential for escalation. It was also noted that U.S. space policy sees interference with its satellite capabilities as an infringement of its sovereign rights.

This led to a discussion about how to determine whether or not this was an intentional use of force or a prelude to an armed attack. Participants noted that just because Country B and Country C were in a period of heightened tensions, you could not assume the action was an attack. It would depend on how much actual military utility was degraded, and how close the two were to armed attack. Others noted that the incident might have been a case of Country C trying to “send a signal” to Country B. Only two satellites were impacted, and they were only degraded. Country C did not attack any launch detection satellites. Thus, it may have been a deliberately restrained attack to try and deter Country B.

In debating the more aggressive options, several participants noted that a proportional response does not necessarily mean one in kind. If the incident was determined to be an attack on a satellite, it is not necessary to limit the responses to an action against Country C’s satellites. A few participants noted that an additional option might be to conduct a cyberattack on the laser facilities to try and degrade or interrupt their capabilities, and see if that halted the anomalies. Participants noted that even if the option for a hypersonic attack on the laser facilities is proportional, there is still a question of whether it is lawful to begin with. Under *jus in bello* IHL rules, proportionality is determined by whether the anticipated military advantage is exceeded by the expected civilian casualties.¹⁶

Other participants noted that even if you don’t respond with a specific action, that does not mean you do nothing. It is almost certain that Country B would continue to collect intelligence to try and assess what happened, the cause of the malfunction, and whether it was the prelude to an armed attack. Many participants noted that Country B would internally debate options, and that this would create a time lag before a decision could be made. It would probably be very difficult to make a decision before the next satellite passes over the suspected laser ground stations, but that itself could provide more information if those additional satellites were similarly affected. Additionally, states which are friendly to Country B could be approached to see if they had been having trouble with their satellites as well. One participant noted that Country B’s hand might be forced by national pressure when knowledge of the situation leaked to the press. They noted that it would be a perfect opportunity for an opposition political party to grandstand and use the issue to score political points. Also a factor would be Country B’s assessment of resilience - does it have backup systems, for example? Furthermore, how good is the space situational awareness (SSA) of the countries involved in this scenario?

As the scenario progressed to actual armed conflict between Country B and Country C, the discussion focused more on *jus in bello* IHL considerations. Participants noted that the two main

¹⁶ Additional Protocol I of the Geneva Convention, at art. 51(5)(b). *See also* art. 55 on the protection of the natural environment.

considerations in targeting were *distinction* and *proportionality*. One participant explained that *distinction* is the requirement to distinguish between military objectives and civilian objects, it being permissible to target and attack civilian leadership only if they are in the chain of command or otherwise taking a direct part in hostilities. Political leaders outside the chain of command and who do not so participate are considered protected civilians. Meanwhile, *proportionality* is a determination on whether expected civilian casualties are excessive in relation to military advantage. Commanders need to choose proportionate means and methods that will cause the least civilian damage. If there are multiple target options yielding similar advantage, commanders need to choose the one(s) that will yield the least civilian casualties. The commander makes the decision before the attack based on expected benefits and losses.

A specific question arose as to the civilian casualties created from Country C's ballistic missile attacks on Country B. In the scenario, there were significant civilian casualties as a result of Country C's degradation of Country B's missile defense system. Participants agreed that if another country degrades your targeting and it results in more casualties, you are not likely to be held accountable. However, if a commander knew about the degradation and did not factor it into their proportionality considerations, that could lead to a violation of the law. It was pointed out that the requirement to base proportionality on expected outcomes means you need to take any surprising or unintended results from previous decisions and factor them into future ones, including resolving erroneous targeting.

Towards the end, the discussion shifted to the use of kinetic space-based weapons to attack ground targets. One participant asked if because such a system cannot be defended against, perhaps it would be perceived as being "unfair". Several people pointed out that it's the goal of the military is to be as unfair as possible, within the boundaries of the law. As long as such systems adhere to distinction and proportionality, they can be used within the law of armed conflict.

This precipitated a discussion about whether different states are held to different legal standards. Some participants argued that states are held to the legal standard to which they are capable of rising to, and that countries with more capabilities are held to a higher standard. However, others disagreed, and provided examples using precision-guided munitions (PGMs). During the first Gulf War, there was pressure to use PGMs even though they were much more expensive and very limited in numbers. The U.S. position that emerged was that there is no international legal requirement to use PGMs, and you can use "dumb" bombs in certain situations.

Another significant discussion topic was on the issue of the proportionality of military actions destroying robotic satellites instead of humans on the ground. Several participants made the point that while satellites have historically been seen as the more logical military option compared to attacks on the ground that might mean killing humans that belief may be changing. One reason may be that attacks on satellites which have significant civil uses, in weather forecasting or disaster warning for example, could lead to civilian casualties. Others suggested that the increased concern

over the long-term sustainability of space due to long-lived space debris could lead to greater restraint on using kinetic weapons against satellites.

Other participants noted that in the cyber world, there is a high bar to get authorization to conduct cyberattacks that have kinetic effects, and wondered how mature the rules of engagement (ROEs) were for attacking space targets. In response, another participant noted that current US ROEs have a preference for responding against ground targets instead of space targets, and that there is currently a shift underway away from temporary and reversible capabilities towards kinetic.

Another participant noted that these discussions need to be broader than just the countries directly involved in the military activities. Many countries utilize satellites services provided by other countries or commercial companies, and are very concerned about being denied access to satellite services that they do not own or control. Losing access to those services as a result of direct military actions or a long-term degradation of the space environment could have broad impacts to their own national interests. Thus, they are very concerned about being left out of the discussion on defining self-defense in space and use of force against space objects. Another participant noted that the United States has often prevailed in multilateral fora on space issues because it's allied itself with the interests of developing countries, and that this may be another situation where that strategy could work.

In the end, participants noted that the main difference between space and other domains of military activity is that the space domain does not have the infrastructure, experience, and tactics, techniques, and procedures (TTPs) to make these sorts of targeting decisions. Other domains, particularly the air domain, have integrated military lawyers with operators and commanders to be able to include the law of war in their decision-making and targeting. At the moment, the military space domain has none of that, and could potentially learn quite a bit from how the other domains approach the issue.

SCENARIO 3 - HYBRID WARFARE AND COLLECTIVE SELF-DEFENSE

Country R and Country S have a bilateral, mutual self-defense agreement with each other. Country R is a middle space power with some space capabilities, primarily for ISR. Country S has no militarily-useful space capabilities. Per bilateral agreement, Country R provides Country S with very limited access to some of its space capabilities for intelligence purposes.

Country S has on-going tensions with its neighbor, Country F, centered on a border region. The region has swapped control several times, and currently is under Country S's control despite being predominantly populated by people indigenous to Country F. Country F has approximately the same level of technological sophistication as Country S, and only very limited space capabilities of its own. Insurgents in the border region between Country S and F launch armed attacks against Country S's occupying military forces, and eventually seize control of some key facilities and cities. At the same time, Country R begins to detect jamming against its space-based satellite navigation system. The jamming is localized to the border region between Country S and Country F. The jamming prevents civil or military use of the satellite navigation system by either Country R or Country F, but does not affect users outside the region.

Questions to consider

- Can Country F be held responsible for the jamming?
- What legal options do Country R or Country S have to respond to the jamming?

Further scenario developments

Country S publicly accuses Country F of backing the insurgents as an attempt to destabilize the border region and seize control. Satellite imagery indicating Country F is mobilizing military forces near the border region is leaked to the media. In response, Country S mobilizes its own military forces to reinforce the border region, which begin to wage an aggressive counterinsurgency campaign against both the insurgents and the population.

A mobile, ground-launched ballistic missile is launched from Country F. The payload detonates in LEO at the altitude used by many ISR satellites, creating a significant debris field. Within days, two of Country R's satellites are disabled, likely through collisions with pieces of debris too small to track. Analyses show that all satellites in the region are likely to experience significant risks of collision for the next 20 years. A week later, Country F's military forces enter the border region under the pretense of stopping what it considers to be ethnic cleansing.

Country S asks Country R to come to its defense.

Further questions to consider

- Under what circumstances could Country F’s creation of a debris cloud in orbit be considered an armed attack on Country R?
- How does the Liability Convention play into the discussion of self-defense and international law?

Moderated discussion – Lead by Victoria Samson, Washington Office Director, SWF

The first part of the discussion on Scenario 3 focused on the topic of “hybrid warfare”, which has recently emerged as a topic within the international community. Hybrid warfare may refer to a blurring of the lines between peacetime on the one hand, where *jus ad bellum* determines the lawfulness of a state’s military actions, and openly acknowledged conflict on the other hand, where *jus in bello* applies. Hybrid warfare can involve the use of covert actions, proxies, and undeclared combatants. Although not new, hybrid warfare has emerged as a topic of interest due to the recent conflicts in Crimea, Ukraine, and Syria. Several participants noted that hybrid warfare seems designed to make it difficult for law-abiding countries to take action.

One issue is whether or not Country S could be held responsible for the jamming. Several participants noted that state attribution is an issue in determining whether the action(s) constitute an internationally wrongful act.¹⁷ Under space law, the actions on non-governmental entities are directly attributable to the internationally responsible government as its national space activities. However, under general principles of international law, and according to international jurisprudence, the situation is more nuanced.¹⁸

If the action is proscribed by one or more agreements or treaties, then it is potentially an internationally wrongful act. However, some participants noted that states may take a sovereign exception for doing something different in its own territory. Others noted that exception is fairly

¹⁷ Draft Articles on State Responsibility, *supra* note 2, at Chapter II - Attribution of Conduct to a State.

¹⁸ Draft Articles on State Responsibility, *supra* note 2, at art. 8 (“The conduct of a person or group of persons shall be considered an act of a State under international law if the person or group of persons is in fact acting on the instructions of, or under the direction of, that State in carrying out the conduct.”) *See also* Military and Paramilitaries (Nicar. v. U.S.) 1986 I.C.J. 14 (June 27). In *Nicaragua*, the ICJ distinguished between two classes of individuals not having the status of state organs by law, but nevertheless acting on behalf of that state: (1) those totally dependent on the foreign state – paid, equipped, generally supported by, and operating according to the “planning and direction” of organs of that state; and (2) persons who, although paid, financed and equipped by a foreign state, nonetheless retained a degree of independence of that state. The ICJ then held that only acts performed by the first class of persons were attributable to the foreign state.

toothless for space systems because it is rare their activity occurs only within the jurisdiction of one country.

As was the case with the first scenario, the participants agreed that there are few legal options. Participants once again noted that while the ITU agreement prohibits deliberate interference, the ITU has no enforcement mechanisms and can only call for consultations between member states to resolve the interference. One participant wondered if there was any precedence for liability under the ITU or other treaties due to interference. Another participant asked if the Permanent Court of Arbitration, which recently adopted a protocol for space cases, could be a venue for resolving the issue¹⁹. Others pointed out that the PCA is a vehicle for offering arbitration services, but it is only available by consent - it does not have compulsory jurisdiction. Both parties need to agree to use it to resolve a situation, which is unlikely during periods of tension or hostilities.

Once again participants noted that there was an absence of firm international law applicable to this situation, along with options available to Country S or Country R. Participants discussed the applicability of the international jurisprudence, including the *Nicaragua* and *Tadić* cases, along with the ICJ's examination on effective governmental control over nationals in the Bosnian genocide. There was also a discussion about the recent effort to create a legal standard by which a state can act in self-defense in response to non-state actors when another state with jurisdiction over those actors is "unwilling or unable" to do so. This is a standard that has been pushed by the United States as part of its counterterrorism efforts, but is currently not accepted by more than a handful of states.

As the scenario progressed to Country F's use of a ballistic missile to create a debris field that eventually damages satellites, the discussion focused on whether or not that violated any international laws. Participants noted that it may be considered a breach of the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques,²⁰ but only if the creation of the debris field was by a "military technique." One participant asked if it could be seen as an "armed attack" against all the space-faring states, or whether it was an international armed conflict. Some participants asked why it would have been done if not to damage satellites, while others pointed out that it may not have been a use of military force. Still others point out that intent matters, and specifically whether Country F intended to harm all countries' satellites. They cited the case of the United States' unintentional bombing of the Chinese embassy in Belgrade in 1999 to point out that harm does not always mean there was a deliberate use of force against that country.

¹⁹ Permanent Court of Arbitration, *Optional Rules for Arbitration of Disputes Relating to Outer Space Activities* (Dec. 11, 2011), available at http://www.pca-cpa.org/showpagecafe.html?pag_id=1188. See also Judge Fausto Pocar, *An Introduction to the PCA's Optional Rules for Arbitration of Disputes Relating to Outer Space Activities*, 38 J. Space L. 171 (Spring/Summer 2012) available at <http://www.spacelaw.olemiss.edu/jsl/back-issues/jsl-38-1.html>.

²⁰ Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, May 18, 1977, 1108 U.N.T.S. 151, available at <http://go.usa.gov/3dXHm>.

Others argued that because Article 51 of the United Nations Charter recognizes that self-defense is an inherent right of sovereign states, it does not *create* that right (emphasis added). Thus, even if a state suffered a fairly minor armed attack, it would still have some rights to engage in self-defense. In this case, a lot of states would be able to claim they are subject to an armed attack, although some participants argued they would not be required to and need not invoke Article 51 to justify their response. One participant noted that it is a big leap to label something an armed attack when it is actually the result of collateral damage.

On the question of the Liability Convention, most participants said that it probably does not apply between the belligerents (Country S and Country F). However, it may apply between a belligerent and a neutral state, such as another state that had one of its satellites damaged by the debris created by Country F. Commercial satellite operators that suffered damage would need to appeal to their state of Registry. It was also pointed out that liability is very difficult to determine. In the only case where there was actual payment for damages created by a space object²¹, it was done outside of the legal processes created by the Liability Convention. And in all situations of potential response, many participants noted the huge challenge surrounding the SSA data that would be needed to figure out damages and potential liability.

A significant part of the discussion asked whether or not the creation of a debris field has similarities to actions in other domains. Specifically, whether it would be legally similar to mining a strait or harbor or a blockade in the maritime domain, or creating minefields in the land domain. Participants agreed that while there are some similarities, none of these analogies are complete. Mining and blockades are declared methods of warfare, each of which has at least some legal and operational precedence. One participant noted that the authors of the Tallinn Manual had a big debate over what a blockade might mean in the cyber domain. Several participants commented that it is possible to avoid going through minefields in the land and maritime domains, but not so with space where satellites largely move on fixed trajectories. Others pointed out that while it is one thing to deny an adversary use of a domain during a conflict, it is another thing entirely to contaminate it for everyone. Some raised the question of whether or not "space mines" meet the test of being able to discriminate, as required under international law.

Towards the end of the discussion, several participants pointed out that we needed to be realistic about what law can bring to these problems. International law on use of force and armed conflict is underdeveloped in general, meaning there is a lack of concluded cases and precedence, and particularly so in space. Others pointed out that the group's struggle to answer many of the issues raised by these scenarios with a group of experts highlights how challenging the issue of self-defense is. Most countries likely do not have anywhere near as much expertise that can be brought

²¹ In 1979, a Soviet satellite re-entered over northern Canada and created a significant amount of radioactive contamination on the ground. The Soviet Union agreed to pay \$3 million in damages, but there was never a Claims Commission convened under the Liability Convention.

to bear, which hinders current efforts to negotiate and discuss agreements on self-defense and norms of behavior in space.

CONCLUSIONS

At the end of the workshop, the participants generally had mixed emotions about the experience. All felt that this was a valuable discussion, but also felt that it had barely scratched the surface of what needed to be done to truly understand all the legal, political, and operational nuances of the issue. Most were not surprised at the main findings: the lack of clarity and consensus on the meaning of existing principles in international space law, the lack of existing legal and political mechanisms for resolving situations without use of force, the overall inexperience of the military space world in dealing with *jus ad bellum* and *jus in bello*, and the lack of expertise and capacity to grapple with these issues within the international community. Some felt that the experience highlighted the importance of international discussions on norms of behavior and perhaps even new legal agreements, although most cautioned that much more work would be required to increase understanding and build consensus before meaningful discussions were possible.

The workshop participants generally agreed that the core challenge is the novelty of the topic of self-defense and armed conflict in the context of the space domain. There are centuries of history of conflict on the high seas and on land, and decades of conflict in the air. Consequently, a practice or custom has built up in an organic fashion on how actors actually carry out armed conflict, and the constraints on it, in each of these domains. In newer realms, such as the cyber realm and in space, there is much less (or no) history to draw inferences from. Thus, the major question is whether it will take decades or centuries of conflict in space and cyber to develop similar laws, or if there are lessons that can be drawn from older domains that are applicable to the new that can speed up the process.

From the perspective of SWF, the goal of such a process should be similar to that in other domains – reducing the chances of military conflict, and ensuring that conflict does not have an adverse impact on third parties, commercial and civil actors, and the long-term sustainable use of the space domain. Meeting that goal includes understanding the factors that can drive a crisis in space towards military conflict, and developing a better understanding of the consequences of certain space warfare techniques. That then leads to a question of what mechanism(s) can be put in place to slow down or de-escalate crises that have a space component, and whether or not there are techniques of war in space that all actors can agree should be restricted or prohibited.

Important next steps on this issue include fostering a more substantial discussion between experts and governments on the legal, policy, and operational nuances of self-defense in space, and the potential for additional legal and political mechanisms to help resolve crises outside of the use of force. Future international initiatives to develop political or legal agreements on space security will need to be based on more substantive knowledge and shared understanding about the risks of conflict in space and the rationale for establishing norms of behavior.

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