

DIRECTED ENERGY WEAPONS AND WHY STATES' INTERPRETATIONS OF "ARMED ATTACK" AND "ARMED CONFLICT" SHOULD EVOLVE

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ABSTRACT

Two parallel developments since World War Two demand an evolution of the triggers for when a State has the right to use force in self-defense and when International Humanitarian Law (IHL) should apply. First, States have become increasingly dependent on electromagnetic spectrum (EMS)-based systems for communications, navigation and command and control of critical systems including infrastructure such as nuclear power plants and electrical grids. These EMS-based capabilities are vulnerable, and therein, so are States to attacks by systems that use the EMS; not only traditional arms as contemplated by prevailing international law. Second, States have developed the concept of using beams of pure energy to destroy or disable targets. The most mature concept is the directed energy weapon (DEW). The effects of DEW may not be as direct as conventional weapons, but DEW effects on EMS-based capabilities on which States have become dependent, such as significant damage to critical infrastructure systems, could compel States to respond as if those effects were from traditional arms.

This article argues that to remain relevant and keep pace with the technology, States' interpretations of armed attack and armed conflict, the triggers for a State's right to self-defense and the

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application of IHL, respectively, should evolve to include uses of DEW that have an equivalent, foreseeable scale and effect as conventional, kinetic weapons. In keeping with their textual foundations, the threshold for a State's right of self-defense should remain high, and the threshold for the application of IHL should remain low. Ambiguity in both text and dominant opinions provides flexibility for extending the interpretations of armed attack and armed conflict beyond the conventional arms prevalent at the drafting of the provisions. Even as DEW capabilities advance and States' views of them in international law and IHL evolve, remaining tethered to the texts will simultaneously keep a State's window to use force limited, and the application of IHL protections broad.

I. INTRODUCTION

Amidst rising tensions between two States, one of the States fires a high-energy laser that travels at the speed of light across the vacuum of outer space. It is dialed into a precise point on one or multiple global positioning system (GPS) satellites, jamming the satellite's signals and disrupting the system's functioning. This disruption has immediate effects on the affected State's armed forces and national security communications and has downstream effects on the affected State's economy, management of critical infrastructure from electrical grids to nuclear plants.

Across the globe, an uncrewed aerial vehicle (UAV) is launched from somewhere inside Yemen. Following its pre-determined flight plan using GPS waypoints, the UAV flies west to the Red Sea where, once over international waters, it turns north. The UAV may be armed or it may be conducting reconnaissance; its mission and destination are unclear. As it transits north, a United States (US) Navy ship picks it up on radar 15 nautical miles away from the ship with the UAV expected to pass within 1,000 meters of the ship. The UAV is unresponsive to hails and queries from the ship. Based on a history of UAV attacks and the threat presented by this UAV based on its point of origin, the ship's commanding officer orders the crew to fire the ship's Optical Dazzling Interceptor (ODIN) at

the UAV to prevent the threat to the ship.¹ The ODIN is a directed energy weapon that scrambles the UAV's optical sensor causing a drone to "lose its way" and eventually crash because it loses the ability to target and navigate."² The ODIN fires. The UAV goes into the water.

Fortunately, the above scenarios are hypothetical. Unfortunately, using directed energy weapons such as high energy lasers, State actors truly do have the capability to jam and disrupt satellites or cause UAVs to crash.³ Directed energy weapons (DEW) are capabilities that use the electromagnetic spectrum (EMS) and not kinetic energy from conventional weapons to cause effects. States have used EMS-based capabilities since before WWII.⁴ EMS-based capabilities enable communications and intelligence gathering.⁵ Increasingly, States are developing EMS-based capabilities that have offensive applications such as DEW, meaning that States could use EMS-based capabilities to bring about effects heretofore seen only as the result of conventional weapons such as bombs, bullets and missiles.⁶

¹ KELLEY M. SAYLER, ET AL., CONG. RSCH. SERV., R46925, DEPARTMENT OF DEFENSE DIRECTED ENERGY WEAPONS: BACKGROUND AND ISSUES FOR CONGRESS (2022), <https://sgp.fas.org/crs/weapons/R46925.pdf>.

² Håvard Haugstvedt, *Red Sea Drones: How To Counter Houthi Maritime Tactics*, WAR ON THE ROCKS, (Sept. 3, 2021), <https://warontherocks.com/2021/09/red-sea-drones-how-to-counter-houthi-maritime-tactics/>.

³ See *Hearing To Receive Testimony On The Posture Of The Department Of The Air Force In Review Of The Defense Authorization Request For Fiscal Year 2022 And The Future Years Defense Program Before the S. Comm. On Armed Forces*, 117th Cong. (2021) (statement of Gen. John Raymond, Chief of Space Operations) [hereinafter Gen. Raymond testimony]; SECURE WORLD FOUND., GLOBAL COUNTERSPACE CAPABILITIES (Brian Weedon & Victoria Samson, eds., April 2021), https://swfound.org/media/207162/swf_global_counterspace_capabilities_2021.pdf [hereinafter Counterspace Report]; *China's Progress with Directed Energy Weapons: Hearing before the U.S.-China Econ. and Sec. Rev. Comm. on China's Advanced Weapons* (2017) (testimony of Richard D. Fisher, Jr., Senior Fellow, Int'l Assessment and Strategy Ctr.), https://www.uscc.gov/sites/default/files/Fisher_Combined.pdf [Fisher testimony].

⁴ See, e.g. Tony Long, *Feb. 26, 1935: Radar, the Invention That Saved Britain*, WIRED, (Feb. 26, 2000), <https://www.wired.com/2008/02/dayintech-0226/>.

⁵ Raphael M. Barishansky, *The Role of EMS in Intelligence Gathering*, EMS WORLD, (July 2014), <https://www.hmpgloballearningnetwork.com/site/emsworld/article/11479804/role-ems-intelligence-gathering>.

⁶ See generally *Introduction to Electromagnetic Spectrum Operations*, Air Force Doctrine Publication 3-51, (Jul. 30, 2019), https://www.doctrine.af.mil/Portals/61/documents/AFDP_3-51/3-51-D01-EW-EMSO-Introduction.pdf.

The opening scenarios prompt two questions that this article intends to examine. First, if committed by a State actor, could and should the firing of a DEW be considered an armed attack triggering a State's right of self-defense, and signaling the existence of armed conflict, giving rise to the application of international humanitarian law (IHL)? Next, assuming *arguendo* that it should, what scale and effects must the DEW have to be considered an armed attack?

In the shadows of World War Two (WWII), the foundational documents for *jus ad bellum* and IHL regulated the use of arms with direct physical effects both to narrow the right of States to use force in self-defense and broaden the application of protections under IHL.⁷ The original basis of an "armed attack"⁸ or "armed conflict" centered around the concept of arms, particularly conventional arms such as bombs and bullets.⁹ As States' use of directed energy weapons (DEW) increases and those capabilities advance in destructive potential, should States' interpretation of whether and when their use meets the threshold of an armed attack triggering a State's right to self-defense or the threshold of an armed conflict triggering the application of international humanitarian law (IHL) evolve?

As evidenced in the cyber context, States are beginning to characterize activities not on the instrumentality used, but on the "scale and effects."¹⁰ To remain relevant and at pace with DEW advances, States' interpretations of armed attack and armed conflict, the triggers for a State's right to self-defense, and the application of IHL, respectively, should evolve to include uses of DEW that have an equivalent, foreseeable scale and effects as conventional, kinetic weapons. Such an evolution will better protect non-combatants who would suffer the consequences of those attacks and reduce ambiguity for States as to when IHL would be triggered and apply to responses to attacks that were not executed by traditional instruments, but have similar effects. Moreover, even if States are not

⁷ *Jus ad Bellum and Jus in Bello*, Int'l Comm. of the Red Cross (Oct. 29, 2010), <https://www.icrc.org/en/document/jus-ad-bellum-jus-in-bello>.

⁸ See UN Charter discussion *infra*, sect. 3.A.

⁹ See discussion of Geneva Conventions, Common Article 2 *infra*, sect. 3.A.

¹⁰ Oliver Kessler & Wouter Werner, Expertise, *Uncertainty, and International Law: A Study of the Tallinn Manual on Cyberwarfare*, 26 LJIL 793, 808 (2013).

publicly taking such a position, an interpretive evolution would better reflect the realities of modern conflict.

This article will proceed as follows. Part II of the article begins with a rudimentary background on the EMS and how it is harnessed for military applications. Next, in Part III the article discusses the relevant portions of the Charter of the United Nations (UN Charter) and the Geneva Conventions, the foundational documents for *jus ad bellum* and IHL, respectively. After laying this foundation, the discussion will outline the international ruleset for establishing when State conduct crosses the threshold of an armed attack and armed conflict. Part IV offers State perspectives on unfriendly and hostile acts in cyberspace and when they give rise to the right of a State to use force in self-defense. These perspectives are then compared with States' views on unfriendly and hostile activities by DEW in outer space. The comparison of views of these different domains will outline how hostile, non-kinetic acts are treated in different domains that do not involve the use of conventional arms, even if they have conventional arm-like effects. This juxtaposition hints that States understand the real risks presented by DEW against these vulnerabilities, but may not be willing to publicly declare that position. Part V of the article argues why interpretations of what constitutes armed attack and armed conflict should evolve to view directed energy weapons as equivalent to conventional arms. This part suggests that the terms armed attack and armed conflict have sought to preserve security and protect those not participating in conflict as they were understood at the drafting of their respective provisions. However, as DEW advance, these interpretations must evolve with the technology to remain relevant and reflect the realities of modern conflict. Part VI concludes the article.

II. BACKGROUND

A. *What is the EMS and What is an EMS-based weapon?*

Of the four elemental forces that shape the universe, the only one that has proved highly malleable in humankind's hands is the

electromagnetic (EM) force.¹¹ EM waves take many forms, such as radio waves, microwaves, infrared (IR) radiation, visible light, ultraviolet radiation, x-rays and gamma rays.¹² But their intrinsic properties are defined by two characteristics other than speed: the length of their waves, and the frequency with which those waves vibrate (oscillate).¹³ The full range of frequencies and wavelengths is referred to as the “electromagnetic spectrum.”¹⁴ According to the Lexington Institute, “[c]ertain forms of electromagnetic energy can be fashioned into powerful, precise beams capable of achieving a range of militarily useful effects.”¹⁵ According to the US Department of Defense, “[d]irected energy is an umbrella term covering technologies that produce concentrated EM energy and atomic or subatomic particles,” and a DEW is a “capability using [directed energy] primarily as a means to incapacitate, damage, disable, or destroy enemy equipment, facilities and/or personnel.”¹⁶

B. Directed Energy Weapons

Directed energy weapons promise significant advantages over conventional weapons.¹⁷ DEW’s emissions reach targets at the speed of light—about 300,000 kilometers per second—are not affected by gravity or atmospheric drag, are extremely precise, can be tailored to achieve a range of results—lethal or nonlethal, destructive or disruptive—have deep magazines and relatively low cost per shot, and can be used as both sensing systems and kill mechanisms.¹⁸ But, to date, the promise of DEW has not been fully

¹¹ Daniel Gouré, *Directed-Energy Weapons: Technologies, Applications and Implications*, LEXINGTON INST., (June 6, 2003), <https://www.lexingtoninstitute.org/wp-content/uploads/directed-energy-weapons.pdf>, at 3 (hereinafter Lexington Report).

¹² JOINT PUBLICATION 3-85, JOINT ELECTROMAGNETIC SPECTRUM OPERATIONS (May 22, 2020), https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_85.pdf?ver=2020-07-21-114233-010

¹³ *Id.*

¹⁴ *Id.*

¹⁵ Lexington Report, *supra* note 11, at 3.

¹⁶ JOINT PUBLICATION 3-85, *supra* note 12, at B-3.

¹⁷ See Lexington Report, *supra* note 11.

¹⁸ *Id.* (However, directed-energy weapons also have drawbacks: laser beams are weakened by water vapor, dust and other obscurants, while radio-frequency emissions can be absorbed by any conductive material between the weapon and the target.); Ariel Robinson, *Directed Energy Weapons: Will They Ever Be Ready?*, NAT’L DEF. MAG., (Jul. 1, 2015), <https://www.nationaldefensemagazine.org/articles/2015/7/1/2015july-directed-energy-weapons-will-they-ever-be-ready>.

realized.¹⁹ The promised effects of DEW may not be as direct as conventional weapons, but DEW effects on EMS-based capabilities on which States have become dependent, such as significant damage to critical infrastructure systems, could compel States to respond as if those effects were from traditional arms.

States may be reluctant to discuss EMS-based capabilities for myriad reasons.²⁰ But, two DEW of note, that serve as the basis for this article's analysis are high-energy lasers (HEL) and high-powered microwaves (HPM).²¹ Some applications of HEL and HPM include counter-uncrewed aircraft systems, counter ballistic missile and counter satellite capabilities.²²

Directed Energy Weapons, such as HEL and HPM, are distinguished from conventional weapons.²³ The distinction is based on conventional weapons' reliance on the projection of an object to physically impact another object, whereas with an EMS-based weapon there is no physical touch of one body or object to another.²⁴ Conventional "kinetic" weapons rely on physical impact for their effects, but EMS-based weapons do not.²⁵ Although this distinction does not accurately describe the difference between the weapons, it has become common to the point of acceptance within the literature and State reports.²⁶

Having established a baseline understanding of EMS-based capabilities and their implications for use by States, the article will step through the international legal framework for regulating

¹⁹ Jim Romeo, *An Upward Trajectory for Directed Energy Weapons*, Mil. Aerospace Electronics, (May 24, 2023), <https://www.militaryaerospace.com/power/article/14292443/an-upward-trajectory-for-directedenergy-weapons>.

²⁰ See Counterspace Report, *supra* note 3, (stating, "[p]art of this can be traced to the classified nature of the intelligence on offensive space capabilities and to the unwillingness to reveal details that could compromise sources and methods. But part of it is also the political sensitivity of the topic, and the discrepancies between what countries say in public and what they may be doing behind the scenes.")

²¹ Romeo, *supra* note 19.

²² Sayler, *supra* note 1, at 1.

²³ Sarah Grand-Clément, *Directed Energy Weapons: a New Look at 'Old' Technology*, UN INST. FOR DISARMAMENT RSCH., <https://www.unidir.org/commentary/directed-energy-weapons-new-look-old-technology> (last visited Jun. 27, 2023).

²⁴ US GOV'T ACCOUNTABILITY OFF., GAO-23-106717, SCIENCE & TECH SPOTLIGHT: DIRECTED ENERGY WEAPONS (2023), <https://www.gao.gov/products/gao-23-106717>.

²⁵ *Id.*

²⁶ *Id.*

States' use of force and protections for those not participating in the conflict.

III. LEGAL FRAMEWORK

The international legal framework for how States articulate their bases for using force, including an armed attack, is grounded in the lived experience of WWII where State armed forces used weapons that fired bullets, launched rockets and dropped bombs causing tremendous loss of life and physical destruction.²⁷ Out of this experience, States sought to maintain international peace and offer protection from the horrors of war through the Charter and establishment of the United Nations (UN Charter)²⁸ and development of the four 1949 Geneva Conventions (Geneva Conventions).²⁹ The text of the UN Charter and the Geneva Conventions evidence that the inquiry as to what State actions rose to an armed attack or otherwise noted the existence of an armed conflict was an instrument-based analysis of whether conventional arms were used. Under Article 51 of the UN Charter, an armed attack gives rise to the right of a State to use force in self-defense.³⁰ Under Common Article 2 of all four Geneva Conventions, sufficient use of the armed forces by one State against another meant there was an international armed conflict.³¹ The discussion below will frame this textual analysis, attempt to capture the open question of where the thresholds

²⁷ See *History of the United Nations*, UNITED NATIONS, <https://www.un.org/en/about-us/history-of-the-un>, (last visited Jun. 27, 2023).;

²⁸ U.N. Charter, Jun. 26, 1945, 59 Stat. 1031 [hereinafter U.N. Charter].

²⁹ Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, Aug. 12, 1949, 6 U.S.T. 3114, 75 U.N.T.S. 31 [hereinafter GWS]; Geneva Convention for the Amelioration of the Condition of the Wounded, Sick and Shipwrecked Members of Armed Forces at Sea, Aug. 12, 1949, 6 U.S.T. 3217, 75 U.N.T.S. 85 [hereinafter GWS-Sea]; Geneva Convention Relative to the Treatment of Prisoners of War, Aug. 12, 1949, 6 U.S.T. 3316, 75 U.N.T.S. 135 [hereinafter GPW]; Geneva Convention Relative to the Protection of Civilian Persons in Time of War, Aug. 12, 1949, 6 U.S.T. 3516, 75 U.N.T.S. 287 [hereinafter GC].

³⁰ U.N. Charter art. 51. (States have viewed that there are two requirements for States to use force in self-defense: necessity and proportionality. These requirements derive from the *Caroline Affair*. See Letter from Daniel Webster to Lord Ashburton (July 27, 1842), in *DIPLOMATIC AND OFFICIAL PAPERS OF DANIEL WEBSTER WHILE SECRETARY OF STATE*, 104, 104 (1848), <https://archive.org/details/diplomaticandof00statgoog>.

³¹ GWS, *supra* note 29, art. 2; GWS-SEA, *supra* note 29, art. 2; GPW, *supra* note 29, art. 2; GC, *supra* note 29, art. 2. (this article focuses on international armed conflict, thus non-international armed conflict is outside the scope of this article).

are for determining an armed attack and armed conflict, especially for non-conventional, non-kinetic weapons, and how the law should evolve to better address the effects of EMS-based capabilities that are equivalent to those of conventional weapons.

A. Foundational Documents

Jus ad bellum, or the law on the use of force, refers to the conditions under which States may resort to war or the use of armed force in general.³² The prohibition against the use of force amongst States and the exceptions to it, such as self-defense and the UN Security Council resolution authorizing the use of force, set out in the UN Charter, are the core ingredients of *jus ad bellum*.³³ For *jus ad bellum*, as it is States most common excuse for resorting to force in international relations, the key inquiry is what actions trigger the right of a State to use force in self-defense? A related and separate question is, what activities prompt the invocation of international humanitarian law? This article argues that States' interpretations of "armed attack" and "armed conflict," the triggers for a State's right to use force in self-defense and the application of IHL, respectively, should evolve to include uses of DEW that have an equivalent, foreseeable scale and effects as triggers for conventional weapons. First, the textual foundations of "armed attack" and "armed conflict" are reviewed before turning to the prevailing interpretations of these texts.

The foundational document for modern *jus ad bellum* is the UN Charter. Drafted in 1945 following the destruction of World War II, the UN Charter includes in its principles that Member States shall refrain from the use of force against any State.³⁴ This prohibition does not cover economic coercion.³⁵ But, this prohibition

³² INT'L COMM. OF THE RED CROSS, *International Humanitarian Law: Answers to your questions*, (Dec. 2014), <https://www.icrc.org/en/doc/assets/files/other/icrc-002-0703.pdf> [hereinafter ICRC Answers Your Questions]. Of note, the United States treats any use of force against it as giving rise to the right of self-defense. See, e.g. Harold Honhgu Koh, Legal Advisor of the Dep't of State, International Law in Cyberspace, Address to the USCYBERCOM Inter-Agency Legal Conference (Sep. 18, 2012), <https://2009-2017.state.gov/s/l/releases/remarks/197924.htm> [hereinafter Koh Remarks].

³³ ICRC Answers Your Questions, *supra* note 32.

³⁴ U.N. Charter art. 2, ¶ 4.

³⁵ See Michael N. Schmitt, *Computer Network Attack and the Use of Force in International Law: Thoughts on a Normative Framework*, 37 COLUM. J. TRANSNAT'L L. 885 (1999)

on States' uses of force has an exception. In Article 51, the Charter's recognizes that all States have an inherent right of self-defense if an armed attack occurs.³⁶ The Charter does not define "use of force" or "armed attack" which allows for flexibility in interpretation and application. Other provisions in the Charter address the processes for States to take all necessary measures to restore international peace and security.³⁷ Other international conventions emphasize adherence to the UN Charter in outlining the responsibilities of signatory States in the interest of international peace and security.³⁸

Relatedly, drafted in 1949, the Geneva Conventions are foundational documents for international humanitarian law that regulates the conduct of armed conflict and seeks to limit its effects on those who do not take part in fighting³⁹ and those who can no longer fight.⁴⁰ These conventions share several common articles, the second of which is the triggering mechanism for when the conventions and international humanitarian law apply. Specifically, the text of Common Article 2 states, "the present Convention shall apply to all cases of declared war or of any other armed conflict which may arise between two or more of the High Contracting Parties."⁴¹ The Geneva Conventions have been universally ratified so every State is a High Contracting Party.⁴² Under this provision, the application of international humanitarian law turns on whether there is an

(Citing the U.N. Charter negotiations, "analysis based on both UN Charter travaux and text leads to an interpretation excluding economic, and for that matter political, coercion from Article 2(4)'s prescriptive sphere.")

³⁶ U.N. Charter art. 51 (stating in relevant part "[n]othing 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, until the Security Council has taken measures necessary to maintain international peace and security.")

³⁷ UN Charter art. 42.

³⁸ See, e.g., Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, art. III, Jan. 27, 1967, 18 U.S.T.2410, 610 U.N.T.S. 205 [hereinafter OST]; Protocol (I) Additional to the Geneva Conventions of August 12, 1949, and Relating to the Protection of Victims of International Armed Conflicts, Jun. 8, 1977, 1125 U.N.T.S. 3 [hereinafter AP I].

³⁹ See generally GC, *supra* note 29; GPW, *supra* note 29.

⁴⁰ See generally GWS, *supra* note 29; GWS-Sea, *supra* note 29.

⁴¹ GWS, *supra* note 29, art. 2; GWS-SEA, *supra* note 29, art. 2; GPW, *supra* note 29, art. 2; GC, *supra* note 29, art. 2.

⁴² See ICRC Answers Your Questions, *supra* note 32, at 21.

armed conflict between two States.⁴³ Armed conflict is not further defined in the Conventions, so, much like the determination of armed attack under the UN Charter, that determination is open for interpretation allowing States and observers to argue for a broader or narrower definition.

Through treaties, the community of States has addressed threats from non-kinetic weapons and the superfluous harms that they can inflict.⁴⁴ As its focus is EMS-based lasers, the most relevant to this article is the Blinding Laser Protocol to the Convention on Certain Conventional Weapons. Unlike the other treaties that prohibit classes of weapons, the Blinding Laser Protocol seeks to prevent a certain type of injury.⁴⁵ For this article, none of these particular treaties elaborates on whether a violation of the terms rises to the level of an armed attack or an indication of armed conflict. Rather, these international instruments reflect the intent of the international community, consistent with IHL, to prevent or reduce superfluous injury.

The Vienna Convention on the Law of Treaties states that international conventions or agreements should be interpreted “in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in light of its object and purpose.”⁴⁶ A plain reading of the applicable provisions of the UN Charter and the Conventions does not offer much value without context because the plain text of the provisions is ambiguous to provide flexibility in application.

As noted above, neither armed attack nor armed conflict is further defined in the respective foundational documents of

⁴³ OSCAR M. UHLER & HENRIE COURSIER, GENEVA CONVENTION RELATIVE TO THE PROTECTION OF CIVILIAN PERSONS IN TIME OF WAR: COMMENTARY 20-21 (Jean Pictet, ed., 1958), <https://www.legal-tools.org/doc/7d971f/pdf/>.

⁴⁴ Protocol (IV) on Blinding Laser Weapons, Annexed to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May be Deemed to be Excessively Injurious or to Have Indiscriminate Effects, Oct. 13, 1995, 1380 U.N.T.S. 163 [hereinafter Blinding Lasers Protocol]; Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction, Jan. 13, 1993, S. TREATY DOC. NO. 103-21, 1974 U.N.T.S. 317 [hereinafter CWC]; Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, Apr. 10, 1972, 26 U.S.T. 583, 1015 U.N.T.S. 163 [hereinafter BWC].

⁴⁵ See Blinding Lasers Protocol, *supra* note 44.

⁴⁶ Vienna Convention on the Law of Treaties, art. 31(1), May 23, 1969, 1155 U.N.T.S. 33 [hereinafter VCLT].

international humanitarian law. There is no central authority under international law to identify or classify a situation as an armed attack or an armed conflict.⁴⁷ Thus, under the Vienna Convention on Treaties, the interpretation and application of these two terms are defined through State practice and context. And, as indicated by Schmitt, “flexibility in interpretation and application is apropos.”⁴⁸ This means that States’ interpretation and application of these terms can evolve. Part IV will describe how States are slowly taking those evolutionary steps in cyber which is a leading indicator of how and where the law will apply to other technological advances in inter-State influence, coercion, and conflict. Next, the article describes the development of how these terms and their foundational texts have been interpreted.

B. Prevailing Interpretations

A plain reading of the relevant terms armed attack and armed conflict calls for focus on what is meant by “armed.” Drafted following WWII, both the UN Charter and the Conventions were intended to reduce the scourge of war, in particular the pain caused by arms and armed forces, from two different aspects. One addresses a strategic State-level approach, while the other intends to regulate the conduct of hostilities on a more individual or personal level.⁴⁹ In its purposes, the UN Charter makes clear its goal of preserving international peace and security, and establishes processes and deliberative bodies for resolving international disputes rather than resorting to arms.⁵⁰ Aiming to protect those not participating in the conflict from the horrors of war, the Geneva Conventions regulate the conduct of armed conflict.⁵¹

The UN Charter intended to set a high threshold to trigger a State’s right to use force in self-defense. At its drafting, the negotiation over the language of Article 51 focused on the phrase “armed

⁴⁷ See ICRC, COMMENTARY ON THE FIRST GENEVA CONVENTION: CONVENTION (I) ON THE AMELIORATION OF THE CONDITION OF WOUNDED AND SICK IN ARMED FORCES IN THE FIELD ¶ 211 (2d ed. 2016), <https://ihl-databases.icrc.org/en/ihl-treaties/gci-1949/article-2/commentary/2016> [hereinafter First GC Commentary 2016].

⁴⁸ Schmitt, *supra* note 35, at 904.

⁴⁹ Laurie R. Blank, *Irreconcilable Differences: The Thresholds for Armed Attack and International Armed Conflict*, 96 NOTRE DAME L. REV. 249, 249 (2020).

⁵⁰ U.N. Charter art. 1.

⁵¹ ICRC Answers Your Questions, *supra* note 32.

attack” instead of “armed aggression.”⁵² With the acknowledgment that the phrase “armed attack,” “would thus limit freedom of action which states could take.”⁵³ In contrast, Common Article 2 intended to set a low threshold to make available the broadest application of IHL protections.⁵⁴

Neither the Charter nor the Conventions provide a clear test on what is meant by either armed attack or armed conflict. This lack of clear tests offers States flexibility to evolve their practice. As Prof. Michael Schmitt states, “because the Charter is the constitutive instrument of an international organization, flexibility in interpretive spirit is apropos.”⁵⁵ However, this flexibility does not mean “that the rules lack any content.”⁵⁶

1. Armed Attack

In 1986, the International Court of Justice (ICJ)⁵⁷ issued a decision in the case *Military and Paramilitary Activities in and Against Nicaragua*.⁵⁸ Building off of customary international law, the ICJ examined what is meant by an armed attack, or what the Court called, “the most grave forms of a use of force.”⁵⁹ Thus, an

⁵² Off. of the Historian, US Dep’t of State, Minutes of the Third Five-Power Informal Consultative Meeting on Proposed Amendments (Part I), Held at San Francisco, Saturday, May 12, 1945, 2:30 p.m., <https://history.state.gov/historicaldocuments/frus1945v01/d224> [hereinafter 1945 Minutes].

⁵³ *Id.*

⁵⁴ Blank, *supra* note 49 at 261.

⁵⁵ Schmitt, *supra* note 35, at 904.

⁵⁶ See, e.g., Oscar Schachter, *In Defense of International Rules on the Use of Force*, 53 U. CHI. L. REV. 113, 127 (1986); YORAM DINSTEIN, WAR, AGGRESSION AND SELF-DEFENSE 18 (3d ed. 2001).

⁵⁷ Established by Chapter XIV of the UN Charter, the International Court of Justice (ICJ) is a permanent body of the United Nations that examines three types of cases: contentious issues, incidental jurisdiction, and advisory opinions. The most relevant types of cases for this article are contentious issues and advisory opinions. For contentious issue cases, two States who have a dispute agree to both letting the Court take jurisdiction over the case and is bound to its decision. In advisory opinions, either the UN Security Council or the General Assembly can request an opinion from the ICJ on any legal question, and other UN organs can request an opinion on questions relevant to that particular body. How the ICJ interprets this remit in the use of force context has been criticized. See generally Abraham D. Sofaer, *The International Court of Justice and Armed Conflict*, 1 NW. UNIV. J. INT’L HUM. RTS. 1 (2003).

⁵⁸ *Military and Paramilitary Activities in and Against Nicaragua* (Nicar. v. U.S), Judgement, 1986 I.C.J. 14, (June 27) [hereinafter *Nicaragua*].

⁵⁹ *Id.* ¶ 191.

armed attack is a use of force, but it is the most severe or grave form of force, which denotes a difference between a use of force and an armed attack.⁶⁰ In determining what constituted an armed attack, the ICJ focused on the “scale and effects” of any hostile action directed at a State.⁶¹ For the ICJ, the victim State, “must form and declare the view that it has been so attacked.”⁶²

In the *Oil Platforms* Case in 2003, the ICJ affirmed the conclusions it arrived at in the *Nicaragua* case, that an armed attack constitutes the “most grave form of the use of force.”⁶³ In its analysis, the ICJ could not “exclude the possibility that the mining of a single military vessel might be sufficient to bring into play the ‘inherent right of self-defence.’”⁶⁴ The ICJ’s discussion is cited as “reflecting the lower end of the armed attack continuum...[a]n attack on an unmanned military drone that places no lives at risk falls well below this level of severity.”⁶⁵

In 1996, the ICJ issued its advisory opinion on the *Legality of the Threat or Use of Nuclear Weapons*.⁶⁶ In this opinion, the ICJ observes that Articles 2(4) and 51 of the UN Charter’s prohibition of the use of force and self-defense respectively, apply to “any use of force, regardless of the weapons employed.”⁶⁷ International law experts have viewed the ICJ’s opinion as reflecting customary international law that the determination of a use of force should not bear on the means but the effects.⁶⁸ As will be discussed in Part IV, it is

⁶⁰ See Blank, *supra* note 49 (Stating “[a]t a minimum, although it appears ‘almost impossible to fix the threshold of force employed to define the notion of armed attack,’ one can conclude that some level of gravity is required to distinguish an armed attack from a use of force.” (quoting Natalino Ronzitti, *The Expanding Law of Self-Defence*, 11 J. CONFLICT & SEC. L. 343, 351 (2006)).

⁶¹ *Nicaragua*, *supra* note 58, at ¶ 195.

⁶² *Id.*

⁶³ *Oil Platforms* (Iran v. U.S.), Judgement, 2003 I.C.J. 161 (Nov. 6), ¶ 20 [hereinafter *Oil Platforms*]; Claus Kress, *On the Principle of Non-Use of Force in Current International Law*, JUSTSECURITY.ORG, (Sept. 30, 2019), <https://www.justsecurity.org/66372/on-the-principle-of-non-use-of-force-in-current-international-law/>.

⁶⁴ *Oil Platforms*, *supra* note 63, at ¶ 20.

⁶⁵ Michael Schmitt, *Top Expert Backgrounder: Aborted U.S. Strike, Cyber Operation Against Iran and International Law*, JUSTSECURITY.ORG, (Jun. 24, 2019), <https://www.justsecurity.org/64669/top-expert-backgrounder-on-aborted-u-s-strike-and-cyber-operation-against-iran-and-international-law/>.

⁶⁶ *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, 1996 I.C.J. 226, 240 (July 8) [hereinafter *Nuclear Weapons*].

⁶⁷ *Id.* ¶ 39.

⁶⁸ *Id.*

still an open question if the ICJ's view that a use of force is not determined by the weapon or instrument employed has crystalized among States.

The ICJ's opinions have been critiqued. First, the ICJ looked to customary international law and "reliance on non-binding United Nations General Assembly Resolutions to establish the requisite *opinio juris*."⁶⁹ Based on its "most grave forms of use of force" language, the ICJ's discussion of armed attack has been viewed as a narrow one where an "armed attack" requires a "massive military operation."⁷⁰ This means, according to Sofaer, "[a]nything short of a full-fledged attack, such as providing arms, strategic advice or tactical assistance to a country that was trying to overthrow a government of another country, cannot be considered an attack under Article 51 for purposes of collective self-defense."⁷¹ But, Sofaer's reading sets a high bar that limits how States can defend themselves. Thus, following Sofaer's critique and the seemingly incongruous definitions provided by the ICJ, others have argued that international courts "have never provided sufficient guidance on the level or kind of violence that satisfies that threshold [, but r]ather . . . have preserved considerable ambiguity on the question of when the armed-attack threshold is met and, therefore, whether Article 51 is triggered."⁷² As observed by Blank, "[t]he ICJ's jurisprudence can appear somewhat inconsistent in pinpointing the notion of gravity, juxtaposing the "scale and effects" and gravity discussion in the Nicaragua case with the statement in the *Oil Platforms* case that the mining of a single military vessel could be sufficient to meet the definition of an "armed attack."⁷³

As much as the ICJ's opinions have left the question unanswered, State practice has not clarified the armed attack threshold. States "are often silent on the specific nature of acts that could constitute or could constitute an armed attack."⁷⁴ As discussed in Part IV, States' public statements demonstrate a slow evolution towards

⁶⁹ Schmitt, *supra* note 35, at 904 (1999)

⁷⁰ Kress, *supra* note 63.

⁷¹ See Sofaer, *supra* note 57.

⁷² Monica Hakimi & Jacob Katz Cogan, *The Two Codes on the Use of Force*, 27 *EUR. J. INT'L L.* 257, 271–72 (2016).

⁷³ See Blank, *supra* note 49, at 255 (ICJ opined that the purpose of a high threshold for self-defense was to preserve peace).

⁷⁴ *Id.* at 253 (citing Hakimi and Cogan, *supra* note 72).

accepting uses of force other than with conventional arms as giving rise to the right of self-defense.

2. Armed Conflict

As discussed above, the text of Common Article 2 of the universally ratified Geneva Conventions sets the existence of armed conflict between two States as the triggering condition for the application of international humanitarian law, but the Conventions are silent as to the definition of what constitutes armed conflict.

Like the “armed attack” discussion, international courts have offered their interpretation of “armed conflict.” In *Tadic*, the International Criminal for the Former Yugoslavia (ICTY) stated, “an armed conflict exists whenever there is a resort to armed force between States [...]”⁷⁵ ICTY uses “armed force” to define “armed conflict,” but does not further define armed force. This use of armed force as the defining characteristic speaks to the acceptance that the term “armed force” means the use of kinetic weapons, like those which caused devastation across the globe in both World Wars. It was these weapons that were the focus of the drafters of the Geneva Conventions, and as a result led to international tribunal’s interpretation of the existence of an armed conflict. Although ICTY defined armed conflict by focusing on the presence of armed force, there still must be an examination of the threshold at which the presence of armed force brings an armed conflict into existence.

Jean Pictet’s commentaries outline a low threshold for the existence of an armed conflict.⁷⁶ In the 1958 commentary on Common Article 2, Pictet observed:

Any difference arising between two States and leading to the intervention of armed forces is an armed conflict within the

⁷⁵ Decision on the Defence Motion for Interlocutory Appeal on Jurisdiction, Prosecutor v. Tadić, Case No. IT-94-1, A.C., 2 Oct. 1995, <https://www.icty.org/en/sid/7227>.

⁷⁶ As Director of the ICRC after WWII, Jean Pictet is linked to the institution and development of international humanitarian law as a special branch of contemporary international law. See *A Tribute to Jean Pickett*, ICRC, <https://international-review.icrc.org/sites/default/files/S0020860400019860a.pdf>, (last visited Jun. 27, 2023). Pictet undertook the preparatory work leading to the adoption of the four Geneva Conventions in 1949 and was general editor of the four-volume Commentary on the 1949 Geneva Conventions. See *Commemorating Jean Pictet by Keeping His Legacy Alive*, ICRC (Sept. 18, 2014), <https://www.icrc.org/en/document/commemorating-jean-pictet-keeping-his-legacy-alive>.

meaning of [Common] Article 2, even if one of the Parties denies the existence of a state of war. It makes no difference how long the conflict lasts, or how much slaughter takes place. The respect due to the human person as such is not measured by the number of victims.⁷⁷

Although there is near universal acceptance of a low threshold for the existence of an armed conflict without specific criteria,⁷⁸ there is a lack of clarity on where States interpret that threshold.⁷⁹ Just as with interpreting an armed attack, flexibility in interpretive spirit is apropos for the Geneva Conventions as well.

IV. EVOLVING TOWARDS EQUIVALENCY

Information (cyber) and outer space technologies have become the new tools for interstate relations and weapons for conflict.⁸⁰ Learning from the expanding importance of and dependence on computers and other information technologies and space systems, States have used advances in these areas to influence and coerce other States.⁸¹ With the ability to harness the EMS to cause

⁷⁷ UHLER & COURSIER, *supra* note 43, at 20-21; *see also* First GC Commentary 2016, *supra* note 47, at ¶ 211 (reinforcing this position by stating, “the determination of the existence of an armed conflict within the meaning of Article 2(1) must be based solely on the prevailing facts demonstrating the de facto existence of hostilities between the belligerents, even without a declaration of war.”)

⁷⁸ *But see* INT’L LAW ASS’N, FINAL REP. ON THE MEANING OF ARMED CONFLICT IN INT’L LAW 32 (2010), https://www.ila-hq.org/en_GB/documents/conference-report-the-hague-2010-12 (Stating that all armed conflicts have the characteristics of fighting of some intensity.)

⁷⁹ Discussion of where that threshold is for non-international armed conflicts is outside the scope of this article.

⁸⁰ *See, e.g.*, Dan Elliot, *Retired General: US Vulnerable to Cyber Attacks*, ASSOC. PRESS (Apr. 11, 2011) <http://www.businessweek.com/ap/financialnews/D9M HLMCG0.html> (quoting former US Joint Chiefs of Staff chairman General Peter Pace (Retired) that the United States “... has employed cyber attacks in the past”); U.N. Secretary-General, *Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours*, U.N. Doc. A/76/77 (Jul. 13, 2021), <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N21/118/94/PDF/N2111894.pdf?OpenElement>; Brian Garino & Jane Gibson, *Space System Threats*, in AU-18 SPACE PRIMER 273, 274 (2009), <https://www.airuniversity.af.edu/Portals/10/AUPress/Books/AU-18.PDF>; Todd Harrison, Kaitlyn Johnson, & Thomas G. Roberts, *Space Threat Assessment 2019*, CTR. FOR STRATEGIC AND INT’L STUD. (CSIS) (Apr. 2019), <https://aerospace.csis.org/wp-content/uploads/2019/04/SpaceThreatAssessment2019-compressed.pdf>.

⁸¹ *See, e.g.*, John Markoff, *Before the Gunfire, Cyberattacks*, N.Y. TIMES (Aug. 12, 2008), <https://www.nytimes.com/2008/08/13/technology/13cyber.html> (outlining Russia’s

physical damage equivalent to an armed attack, States have embraced these capabilities in both the cyber and outer space domains.⁸² Public statements by States demonstrate that States are not only embracing the use of EMS-based weapons but also understand the implications of those weapons on international law, such as a State's right to use force in self-defense and IHL.⁸³ Two domains where the international community has been active in attempting to clarify State views to gain consensus on the law with respect to cyber and outer space.

Cyber and outer space activities present an interesting juxtaposition of the main inquiries of this article, if and when can non-conventional, non-kinetic weapons rise to an armed attack or be evidence of an armed conflict. As States have embraced these cyber and space capabilities for interstate influence, coercion and conflict, they have also publicly commented on their views of what actions in cyber and outer space rise to the level of use of force.⁸⁴ However, States have been less definitive on what actions give rise to the right of self-defense in cyberspace or outer space.⁸⁵ This part first reviews State statements on cyberspace operations before turning to State public comments on norms of behavior in outer space.

use of cyberattacks on Georgia's Internet infrastructure); Ian Traynor, *Russia Accused of Unleashing Cyberwar to Disable Estonia*, THE GUARDIAN (May 17, 2007), <https://www.theguardian.com/world/2007/may/17/topstories3.russia> (outlining Russia's cyberattacks on Estonia in 2007); Pavel Velkovsky, Janani Mohan, & Maxwell Simon, *Satellite Jamming*, ON THE RADAR (Apr. 13, 2019) <https://ontheradar.csis.org/issue-briefs/satellite-jamming/#fnref:6>.

⁸² See, e.g., Saylor, *supra* note 1; Gen. Raymond testimony, *supra* note 3; Lexington Report, *supra* note 11.

⁸³ Koh Remarks, *supra* note 32.

⁸⁴ Koh Remarks, *supra* note 32; BRIAN EGAN, LEGAL ADVISER, US DEP'T OF STATE, REMARKS ON INTERNATIONAL LAW AND STABILITY IN CYBERSPACE AT BERKELEY LAW SCHOOL (Nov. 10, 2016), <https://2009-2017.state.gov/s//releases/remarks/264303.htm>; Jeremy Wright, Attorney General of the UK, *Cyber and International Law in the 21st Century*, CHATHAM HOUSE (May 23, 2018), <https://www.gov.uk/government/speeches/cyber-and-international-law-in-the-21st-century>; PAUL C. NEY, JR., USDOD GEN. COUNSEL, DOD GENERAL COUNSEL REMARKS AT US CYBER COMMAND LEGAL CONFERENCE (Mar. 2, 2020), <https://www.defense.gov/Newsroom/Speeches/Speech/Article/2099378/dod-general-counsel-remarks-at-us-cyber-command-legal-conference>.

⁸⁵ U.N. Secretary-General, *Group of Governmental Experts on Advancing Responsible State Behaviour in Cyberspace in the Context of International Security*, U.N. Doc. A/76/135 (Jul 14, 2021) [hereinafter 6th GGE Report]; U.N. Doc. A/76/77, *supra* note 80.

A. *Cyber: Sixth United Nations Group of Government Experts*

There have been six Group of Government Expert (GGE) meetings on cyber matters, four of which produced reports (2010, 2013, 2015 and 2021) that the General Assembly subsequently endorsed.⁸⁶ During that time, a group of international law experts acting in their personal capacity and not on behalf of any particular State, unrelated to the GGE process, has drafted two editions of the *Tallinn Manual* on the international law applicable to cyber operations.⁸⁷ Each has influenced the other.⁸⁸ The GGE that met in 2017-2018 failed to produce a report that could find consensus, specifically over the proposed inclusion of the terms “self-defense” and “international humanitarian law,” as well as contentiousness over the right to take countermeasures.⁸⁹

The most recent GGE was able to reach consensus on a report, but as with previous reports, the term self-defense remains absent from the 2021 report.⁹⁰ In a veiled reference to the concept of self-defense, the 2021 report states, “Group noted again the inherent right of States to take measures consistent with international law

⁸⁶ See Michael Schmitt, *The Sixth United Nations GGE and International Law in Cyberspace*, JUSTSECURITY.ORG (Jun. 10, 2021) <https://www.justsecurity.org/76864/the-sixth-united-nations-gge-and-international-law-in-cyberspace/> [hereinafter Schmitt, 6th GGE]; U.N. Off. of Disarmament Aff. (UNODA), *Developments in the Field of Information and Telecommunications in the Context of International Security*, UNODA, <https://www.un.org/disarmament/ict-security/> (last visited June 1, 2023); *Report of the Group of Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security to the General Assembly*, U.N. Doc. A/65/201 (2010); *Report of the Group of Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security to the General Assembly*, U.N. Doc. A/68/98 (2013); *Report of the Group of Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security to the General Assembly*, U.N. Doc. A/70/174 (2015).

⁸⁷ TALLINN MANUAL 2.0 ON THE INTERNATIONAL LAW APPLICABLE TO CYBER OPERATIONS (Michael N. Schmitt ed. 2d ed. 2017) [hereinafter the Tallinn Manual 2.0].

⁸⁸ See *Report on the Official Compendium of Voluntary National Contributions on the Subject of how International Law Applies to the Use of Information and Communications Technologies by States Submitted by Participating Governmental Experts in the Group of Governmental Experts on Advancing Responsible State Behaviour in Cyberspace in the Context of International Security Established According to General Assembly Resolution 73/266A/76/136 to the General Assembly*, U.N. Doc A/76/136 (2021) [hereinafter GGE Compendium] (where Germany and other States adopt or discuss provisions and opinions from the Tallinn Manual).

⁸⁹ See Schmitt, 6th GGE, *supra* note 86.

⁹⁰ *Id.*

and as recognized in the Charter and the need for continued study on this matter.”⁹¹ As one commentator noted, “[t]his can only be a reference to self-defense, for the term ‘inherent right’ is drawn directly from Article 51” of the Charter.⁹²

This absence of any discussion of self-defense from the 2021 GGE report contrasts with the *Tallinn Manual*, which discusses armed attacks.⁹³ Although the international law experts noted that “the law is unclear as to the precise point at which the effects of a cyber operation qualify that operation as an armed attack, . . .” cyber can constitute an armed attack if sufficiently grave, such as one that “seriously injures or kills a number of persons or that causes significant damage to, or destruction of, property [so as to] satisfy the scale and effects requirement.”⁹⁴

In addition to the GGE Report, there was a separate document where individual State submissions, pursuant to the General Assembly Resolution calling for input, were compiled into a compendium.⁹⁵ The individual State submissions provide insight into State positions without the varnish of attempting to reach a consensus for inclusion in the report. The State reports outline that States took varying approaches to delineate whether there can be an armed attack in cyberspace, what is the threshold for such a determination, and how the right of self-defense applies in the cyber context. Some States simply stated that if the cyber operation yielded damage and destruction equivalent to a conventional armed attack, such as large-scale loss of human life and damage to critical infrastructure, then it would be considered an armed attack (Australia).⁹⁶ Other States, using language from the Nicaragua decision posited that if the cyber activity caused had the “scale and effects” that were comparable to an armed attack, then it could be considered an armed attack (Estonia, Japan, Netherlands).⁹⁷ Still others, in examining the scale and effects, specified factors from the

⁹¹ 6th GGE Report *supra* note 85.

⁹² Schmitt, 6th GGE *supra* note 86.

⁹³ Tallinn Manual 2.0, *supra* note 87, at rule 71.

⁹⁴ *Id.*

⁹⁵ GGE Compendium, *supra* note 88.

⁹⁶ *Id.* at 3.

⁹⁷ *Id.* at 23, 44, 54.

Tallinn Manual that would support such a determination (Netherlands).⁹⁸ Other States did not comment.

Hence, the following by Michael Schmitt, the General Editor of the *Tallinn Manual*, remains an accurate description of international law as applied to cyber operations when he wrote in 2012:

After all, the Charter scheme would make no sense if it prohibited States from responding to devastating attacks merely because such attacks were not in the drafters' contemplation decades before they became technically possible. Such legal formalism would take strict constructionism to absurd ends. The advent of cyber operations necessitated a reconceptualization of the notion of armed attack. To date, the international community has failed to achieve consensus on this critical issue.⁹⁹

Turning from international cyberspace operations to outer space activities presents a comparison in how far the law has evolved. In the cyber context, there are the first generative steps towards an evolution where States are beginning to view State uses of cyber to influence, coerce and attack as equivalent to conventional weapons. However, States' public comments demonstrate that States have not evolved their interpretation of the thresholds for an armed attack or armed conflict. There is less clarity on what actions give rise to the right of self-defense and how the use of non-kinetic, DEW which have effects equivalent in scale and effects to a conventional weapon attack are viewed by the international community.

⁹⁸ *Id.* at 54. The factors are: severity, immediacy, directness, invasiveness, measurability of effects, military character, State involvement and presumptive legality. See *Tallinn Manual 2.0*, *supra* note 88, at rule 69.

⁹⁹ Michael N Schmitt, "Attack" as a Term of Art in *International Law: The Cyber Operations Context*, in *PROC. OF THE 4TH INT'L CONF. ON CYBER CONFLICT* 283, 287 (Christian Czosseck, Rain Ottis & Katharina Ziolkowski eds. 2012), https://ccdcoe.org/uploads/2012/01/5_2_Schmitt_AttackAsATermOfArt.pdf.

B. Outer Space: The 2021 Secretary-General Consolidated Report on UN Members' Submission on Reducing space threats through Norms, Rules and Principles of Responsible Behaviors

In the most recent iteration,¹⁰⁰ the UN Secretary-General received a consolidated report of UN Member States' perspectives on reducing space threats through norms, rules and principles of responsible behaviors.¹⁰¹ This report identified threats such as DEW and HPM and that States may be developing these types of weapons.¹⁰² Unfortunately, like past iterations, the report offered no additional guidance on what behaviors would be viewed as giving rise to the right of a State to respond with force in self-defense.

There is another connection to the cyber context. In its submission, France advocated for "the establishment of pragmatic, immediately applicable and non-legally binding norms."¹⁰³ Notably, France proposed basing these norms on the description contained in the 2015 report of the Group of Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security, which states:

Voluntary, non-binding norms of responsible State behaviour can reduce risks to international peace, security and stability. Accordingly, norms do not seek to limit or prohibit action that is otherwise consistent with international law. Norms reflect the expectations of the international community, set standards for responsible State behaviour and allow the international community to assess the activities and intentions of States.¹⁰⁴

It is this spirit that the prevailing view of the law should evolve to how and at what threshold States' use of EMS-based capabilities, such as DEW and HPM, can rise to the level of armed attack or evidence of the existence of armed conflict. The article now attempts to pull together the above threads to justify that evolution.

¹⁰⁰ See *Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities to the General Assembly*, U.N. Doc. A/68/189 (2013).

¹⁰¹ U.N. Doc. A/76/77, *supra* note 80.

¹⁰² *Id.* at 6 (stating, "[d]irected energy weapons include lasers, microwaves, and particle beams. Their effects can be reversible or irreversible, as they could temporarily blind or dazzle sensors, as well as damage, degrade or destroy sensitive components. It is noted that some States may be developing such systems").

¹⁰³ *Id.* at 41.

¹⁰⁴ *Id.*

V. WHY INTERPRETATIONS OF WHAT CONSTITUTES ARMED
ATTACK AND ARMED CONFLICT SHOULD EVOLVE TO VIEW
DIRECTED ENERGY WEAPONS AS EQUIVALENT TO
CONVENTIONAL ARMS

A. Remaining Relevant

Since their drafting, the terms armed attack and armed conflict have served to preserve international peace and security.¹⁰⁵ To remain relevant, they should evolve to match the tools of conflict. Despite the criticism for its lack of clarity and adherence to the UN Charter, the ICJ's *Nicaragua* opinion was correct. The key question a State will look to in determining whether its right to self-defense has been triggered is: what are the foreseeable scale and effects of the activity? Practically, whatever the means of force is used against a victim State, as the ICJ opined, the victim State "must form and declare the view that it has been so attacked."¹⁰⁶ Each State will determine whether the scale and effects of the action against it rise to the level of an armed attack. Therefore, States can and should evolve their public comments about what scale and effects they view as meeting the threshold of an armed attack and armed conflict. As outlined below, this evolution will reflect the realities of advances in DEW.

B. Reflect the Realities of Modern Conflict

As stated at the start of the article two questions framed the argument. First, if committed by a State actor, could and should the firing of a DEW be considered an armed attack triggering a State's right to self-defense, and signaling the existence of armed conflict, giving rise to the application of international humanitarian law (IHL)? Next, assuming *arguendo* that they should, what scale and effects must the DEW have to be considered an armed attack?

The following offer justification for evolving States' interpretations of armed attack and armed conflict to include uses of DEW.

¹⁰⁵ See, e.g., Blank, *supra* note 49; Hakimi and Cogan, *supra* note 72.

¹⁰⁶ *Nicaragua*, *supra* note 58, at ¶ 195.

1. Reflect the Reality of DEW capabilities

The approach to interpreting armed attack and armed conflict should evolve to reflect the reality of the effects that DEW can have. As discussed above, DEW can have equivalent scale and effects to conventional arms that now trigger the right of self-defense under international law and the application of IHL. DEW technology has advanced to the point where they can destroy systems critical to States and lead to significant effects on civilians and those persons and groups which IHL seeks to protect.¹⁰⁷ States will continue to use and further develop these capabilities, so to protect against misinterpretation or gray areas within the law, IHL should evolve to remain relevant with what capabilities should trigger its application.

The two hypotheticals at the top of this article illustrate this point. First, the DEW firing at a satellite. With DEW, the foreseeable effects may be secondary and indirect to the actual operation. In this context, the effects are foreseeable, if the State initiating the activity, “should reasonably be expected to anticipate such effects.”¹⁰⁸ So, if a State uses a DEW to cause another State’s satellite to stop functioning properly and the loss of functionality may affect the victim State’s ability to manage its electrical grid causing deaths and property loss, similar to destruction, and, if the attacking State should reasonably have anticipated—or foresee—such effects, then, the effects at that scale may meet the threshold of an armed attack and prompt the victim State’s right to self-defense, but would not evidence the existence of an armed conflict triggering the application of IHL under the prevailing interpretation.¹⁰⁹ Second, the interference with GPS signals may not amount to a use of force, but the foreseeable effects of downing the UAV increase the severity. Although the downing of the UAV may evidence the existence of an armed conflict and trigger the application of IHL, it likely

¹⁰⁷ See Saylor, *supra* note 1; Gen. Raymond testimony, *supra* note 3.

¹⁰⁸ See Emanuela- Chiara Gillard, *Proportionality in the Conduct of Hostilities: The Incidental Harm Side of the Assessment*, ¶¶ 61– 64, 67, CHATHAM HOUSE (2018), <https://www.chathamhouse.org/sites/default/files/publications/research/2018-12-10-proportionality-conduct-hostilities-incident-harm-gillard-final.pdf>.

¹⁰⁹ See UHLER & COURSIER, *supra* note 43, at 20-21.

fails in terms of scope and effects to rise to the level of an armed attack.¹¹⁰

2. Reflect the Reality of the States' Use of DEW

As STUXNET and other capabilities have demonstrated,¹¹¹ the reality is that non-kinetic weapons can have equivalent destructive scale and effects to conventional kinetic weapons.¹¹² As importantly, States have demonstrated their willingness to continue to develop and use EMS-based weapons.¹¹³ This continuing development of EMS-based capabilities by States is a recognition that EMS-based weapons are effective tools for States to use in inter-State relations, influence, coercion, or conflict.

3. Reflect the Reality of States' View of Instrumentality Instead of Effects

Evidenced above in the compendiums on cyber and space operations, States recognize the reality that non-kinetic capabilities can have kinetic-like effects. Thus, States are beginning to publicly state that whether a harmful act by another State using a non-kinetic, often EMS-based, capability should be viewed by the effects of the act and not the instrument employed.¹¹⁴

This effects-based view is an emerging minority view that may find challenges in gaining purchase by other members of the international community, especially by those States that have invested heavily in DEW and other similar technologies to use against other States.¹¹⁵ At its drafting, the *Tallinn Manual's* view that cyber capabilities can be viewed as equivalent to an armed attack was a

¹¹⁰ See *Oil Platforms*, *supra* note 63.

¹¹¹ See, e.g., Tallinn Manual 2.0, *supra* note 87, at rule 71, ¶ 10.

¹¹² See Eric Talbot Jensen, *Computer Attacks on Critical National Infrastructure: A Use of Force Invoking the Right to Self-Defense*, 38 *STAN. J. INT'L L.* 207, 234-239-40 (2002); Saylor *supra* note 1; Gen. Raymond testimony, *supra* note 3; Fisher testimony, *supra* note 3.

¹¹³ See Gen. Raymond testimony, *supra* note 3; Counterspace Report, *supra* note 3; Romeo, *supra* note 19.

¹¹⁴ See Koh Remarks, *supra* note 32; Counterspace Report, *supra* note 3; Romeo, *supra* note 20.

¹¹⁵ See Fisher testimony, *supra* note 3.

minority amongst States.¹¹⁶ This view has gained credence amongst the international community as States have come to fully appreciate both their vulnerabilities in the cyber domain and the magnitude of the effects that cyberattacks can have.¹¹⁷

This shift in the view of whether the use of a non-kinetic capability can give rise to the right of the victim State to use force in self-defense should not be limited to the cyber domain. As demonstrated by the collection of State submissions to the UN Secretary General threats, norms and responsible behaviors in outer space, States recognize that EMS-based capabilities have tremendous capabilities which can cause calamitous effects.¹¹⁸ Like the early view of the *Tallinn Manual*, the States that view directed energy attacks in the space domain as having the potential to rise to an armed attack are in the minority.¹¹⁹ But, as the *Tallinn Manual's* view that the effects of a non-kinetic capability can give rise to a State's right to use force in self-defense grew in popularity amongst the international community, States may similarly shift their view as they gain access to directed energy weapons that could have kinetic-like effects.

4. Reflect the Reality of Conflict Between States

Evolving States' interpretations of armed attack and armed conflict is necessary to reflect the reality of conflict between States. The prevailing instrument-based view of armed attack and armed conflicts was born out of conflicts where kinetic weapons cause devastating effects. As technologies evolved and vulnerabilities changed, States developed non-conventional, non-kinetic capabilities to exploit those vulnerabilities. Using non-kinetic, EMS-based capabilities enable States to take unfriendly and harmful actions against strategic competitors, but, assuming attribution and the other requirements for using force in self-defense,¹²⁰ evade the characterization of an armed attack based on the instrument.¹²¹

¹¹⁶ Compare TALLINN MANUAL ON THE INTERNATIONAL LAW APPLICABLE TO CYBER WARFARE (Michael N. Schmitt ed. 2012), with Tallin Manual 2.0, *supra* note 87.

¹¹⁷ *Id.*

¹¹⁸ See UN Doc. A/76/77, *supra* note 80.

¹¹⁹ See Counterspace Report, *supra* note 3; Garino and Gibson, *supra* note 80.

¹²⁰ Discussion of inadvertent or unintended effects cause by DEW is outside the scope of this paper.

¹²¹ See Tallinn Manual 2.0, *supra* note 87, at rule 69, ¶ 10.

This technological evolution also alters what instruments States can use to influence and coerce each other.¹²²

Hypothetically, if a State were to be the victim of a DEW attack that interfered with its communications causing damage to electrical grids or financial transactions, would it have a legal right to respond with force? Based on the prevailing interpretation of armed attack today, the answer is likely that the affected State can't respond with force. This is the reality of what can occur in modern conflict and it is why States' interpretations of armed attack and armed conflict must evolve to include uses of DEW that have sufficient scale and effects.

To remain relevant, the view of the thresholds for armed attack and armed conflict should evolve to reflect the capability of DEW to have conventional weapons or traditional arms-like effects. Such an evolution may give States pause when taking action with DEW. That the capability is not a conventional, kinetic weapon should not absolve the acting State from calculating its foreseeable effects and being subject to a response by force from the victim State.

5. Reduce the Chance of Misunderstanding Between States

More than just remaining relevant, the view of the threshold for a State's right to self-defense and IHL should evolve to reduce the chance of misunderstanding between States. There is no consensus on what threats and behaviors by States in space give rise to a State's right of self-defense.¹²³ As DEW continue to evolve, this lack of shared, common understanding of where the threshold of behaviors lies could lead to situations where one State, taking an instrument-based approach, miscalculates how another State would respond to a DEW operation. Evolving the approach to DEW will send a signal to the international community that an effects-based analysis is the prevailing approach may reduce the possibility of these misunderstandings, and, therefore, may change the calculus and possibly the likelihood of a DEW operation that would

¹²² See, e.g., U.N. Doc. A/76/77, *supra* note 80; Dr. Cassandra Steer, *Why Outer Space Matters for National and International Security*, CTR. FOR ETHICS AND RULE OF LAW (CERL) (Jan. 8, 2020), <https://www.law.upenn.edu/live/files/10053-why-outer-space-matters-for-national-and>.

¹²³ See U.N. Doc. A/76/77, *supra* note 80; Talinn Manual 2.0, *supra* note 88.

have foreseeable, armed attack-like effects. This change in the calculus could likely reduce the conflict, and more importantly, limit the effects of war on people and property—the purpose of IHL.¹²⁴

C. Counter-argument: Why the Prevailing Interpretation Should Remain in Effect

The proposed evolution of the treatment of whether a State's use of DEW can trigger a State's right to self-defense and the applicability of the IHL has multiple aspects and some important countervailing arguments that demand discussion. These arguments include the textual support in treaties for analyzing whether there is armed force and the lack of textual support to change that view, the clarity of the current view of armed attack requiring the presence of conventional kinetic arms, and the consistency with State practice.

As discussed above, the UN Charter's trigger to use force in self-defense and Common Article 2's trigger of its application turns on the word "armed." For the UN Charter, it is an armed attack; for Common Article 2, it is declared war or armed conflict. These are textual signals to the international community. These textual reminders are enshrined in all universally applicable treaties. Grounding law in the text is commonsensical and stable.

Beyond the advantages of common sense and stability of a textual approach, an analysis based on treaty text gives clarity. Treaty text should provide parties and non-parties to treaties with guidance on what the treaty means. Therefore, treaty text explains what conduct States are obligated to.¹²⁵ This clarity of expectations sets the conditions for stable relations among States. Deviation from the text for whatever purpose, however noble and relevant, opens the door for interpretations that are not consistent with the intent of the treaty.¹²⁶ In this instance, if the interpretations of armed attack and armed conflict evolved, States looking to capitalize on a perceived military advantage could attempt to justify the use of conventional force by comparing the effects of a non-kinetic action by another State.

¹²⁴ ICRC Answers Your Questions, *supra* note 32.

¹²⁵ See VCLT, *supra* note 46, art. 26.

¹²⁶ *See id.* at art. 42.

States could argue that the ICJ's *Nicaragua* decision opened the door for a broader interpretation of conduct that may not use conventional arms, but still gives rise to the right to self-defense. This is the case with the proposed evolution; DEW use electromagnetic waves are not arms.¹²⁷ This is clear. A broader reading of "armed" as including electromagnetic waves would give States broader latitude to justify using force against another State under an equivalence of effects argument. An effects-based analysis on the use of EMS-based capabilities would be ephemeral because States' views of what is equivalent scale and effects can vary, as demonstrated above.¹²⁸ This broader, equivalency, reading of "armed" for non-armed activities could have the unintended effect of overinclusion of non-military activities, such as economic sanctions, which could have devastating effects on a massive scale.¹²⁹

Next, another argument in support of maintaining the current interpretations of armed attack and armed conflict is that they are consistent with State practice. States have viewed their right to self-defense and when the law of war applies as grounded in the presence of conventional, kinetic arms.¹³⁰ The clarity provided by looking at the treaty texts is mirrored by the consistency in State conduct. States have generally understood where the line of demarcation is for armed conflict and have consistently acted accordingly.¹³¹ This consistency in understanding State practice limits misunderstanding and has supported peace or at least a reduction in the harm to people and property caused by war, which, as mentioned, is the purpose of IHL.¹³² Any disruption and period of recalibration for States to determine again where to draw that line of demarcation using for EMS-based effects could be in a state of perpetual flux as technologies advance and vulnerabilities continue to appear. On net, this shift may be more disruptive than any effects that EMS-based weapons could cause.

¹²⁷ See Lexington Report, *supra* note 11.

¹²⁸ See Tallinn Manual 2.0, *supra* note 87, at rule 69.

¹²⁹ See generally Blank, *supra* note 49; Tom J. Farer, *Political and Economic Coercion in Contemporary International Law*, 79 AM. J. INT'L L. 405, 408 (1985).

¹³⁰ UHLIER & COURSIER, *supra* note 43.

¹³¹ See Blank, *supra* note 49, at 256; Matthew C. Waxman, *Cyber-Attacks and the Use of Force: Back to the Future of Article 2(4)*, 36 YALE J. INT'L L. 421, 431 (2011).

¹³² See Blank *supra* note 49, at 256.

D. Response

Although the clarity and consistency provided by relying on treaty text and State practice are compelling, technological advancements are changing the nature of conflict. True, conflict will still involve devastating kinetic weapons that pierce flesh and destroy houses, schools and infrastructure. But, as EMS-based capabilities continue to evolve in their capacity to cause foreseeable, devastating effects to critical systems upon which States and individuals rely, States will be constrained to respond with a greater degree of coercion than currently acceptable under international law. More importantly, broadening the scope of what triggers a State's right to use force in self-defense and the applicability of IHL may reduce the incidence and severity of attacks targeting EMS-dependent, critical systems by States because of concern of escalation. In short, conflicts are evolving, the law regulating their conduct should as well.

VI. CONCLUSION

As DEW mature and advance in capability, States will use them against other States. This use of DEW will have effects on the people and the property of the victim States. In some instances, the effects will be equivalent in scale and severity to a traditional armed attack by conventional, kinetic weapons. Assuming attribution, the victim State must form and declare the view that it has been so attacked, and observers may determine that IHL should apply. States' public positions evidence a hesitancy to revise their view of armed attack and armed conflict, but for the terms to remain relevant and reflect the realities of modern conflict, the interpretations of those terms should support the victim State in having the full spectrum of responses in self-defense, including force, and that an armed conflict exists between the States. Failing to evolve at the same pace as technology advances will leave the interpretations of armed attack and armed conflict lagging and seeking relevance.

States' interpretations of armed attack and armed conflict should evolve to include when the use of DEW has an equivalent, foreseeable scale and effects as conventional weapons, even if indirect. This evolution will remain faithful to the letter and intent of

the textual triggers for a State's right to self-defense and the application of IHL. It will remain faithful to the letter because the drafters of the relevant treaty provisions did not define those key terms allowing for future generations to apply the terms to the threats they faced just as those who experienced the horrors of WWII wanted to prevent the use of arms as they knew them. It will remain faithful to the spirit of the text in that it will still keep a State's window to use force narrow and the application of the protections of IHL broad.