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Death from above - The Weaponization of Space and the Threat to International Humanitarian Law

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DEATH FROM ABOVE? THE WEAPONIZATION OF SPACE AND THE THREAT TO INTERNATIONAL HUMANITARIAN LAW

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© European Space Agency. Satellites and debris objects in Low Earth Orbit.

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I. INTRODUCTION

SINCE THE DAWN of the satellite age with Russia's *Sputnik 1* in 1957 and the launch of the first communications satellite, *Telstar-1*, five years later,[1] humanity has gradually but undeniably become dependent on satellite communications systems to maintain global economic, military, and informational links between nations.[2] Indeed, in an era where instantaneous international communication is the norm, satellites have become vital instruments for the maintenance of peace and stability.[3] Concurrent with these peaceful developments, ever-more powerful military satellites are today facilitating the prolific use of unmanned combat drones for tactical air strikes and dramatically increasing the degree of global spy surveillance.[4] It is not surprising, then, that rapid advances in technology are leading countries to develop anti-satellite (ASAT) missile weapons systems, ground-based ASAT disruptive lasers (non-kinetic-kill systems),[5] and low-Earth-orbit, space-based drone bombers.[6] The widespread use of drone weapons and the potential use of ASAT weapons in future wars has necessitated scrutiny of how international humanitarian law (IHL) applies to the ongoing weaponization of space and the high-tech nature of combat in the twenty-first century.

II. THESIS

This article argues that the use of ASAT missile weapons and potential use of space-based drone bombers in combat will severely impede the ability of countries to comply with IHL and will increase civilian losses in conflicts. This article also argues that these weapons systems are more akin in nature to weapons of mass destruction (WMDs) and therefore should be treated as such. First, the author argues that the proportionality and distinction considerations set out under Additional Protocol I of

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[1] *See* SPACESECURITY.ORG, SPACE SECURITY 2011, at 78, 98 (2011), *available at* http://www.spacesecurity.org/space.security.2011.revised.pdf.

[2] *See* MICHAEL KREPON & CHRISTOPHER CLARY, SPACE ASSURANCE OR SPACE DOMINANCE? THE CASE AGAINST WEAPONIZING SPACE 105 (2003).

[3] *See id.* at 59–60.

[4] *See* David A. Koplow, *ASAT-isfaction: Customary International Law and the Regulation of Anti-Satellite Weapons*, 30 MICH. J. INT'L L. 1187, 1191–92 (2009).

[5] SPACE SECURITY 2011, *supra* note 1, at 25.

[6] *See* Tom Burghardt, *The Militarization of Outer Space: The Pentagon's "Space Warriors"*, GLOBAL RES. (May 9, 2010), http://www.globalresearch.ca/the-militarization-of-outer-space-the-pentagon-s-space-warriors.

the Geneva Convention (Protocol I)[7] are difficult to determine when using ASAT weaponry. Second, the author argues that ASAT weaponry, when used in conjunction with coordinated cyber-attacks, has the potential to rapidly cripple vital civilian infrastructure and thus harm civilian populations, making the military necessity of ASAT attacks questionable under IHL. Finally, the author argues that while the development of ASAT weapons is a natural by-product of a world dependent on satellite-based communications systems, the use of ASAT weapons in warfare would have a destabilizing effect by encouraging nations to violate the 1967 Outer Space Treaty (OST) in the pursuit of developing space-based WMD systems. As such, this article presents the case for the international community to establish a treaty prohibiting the use of ASAT missiles and space weapons—a treaty similar in nature to the Chemical Weapons Convention—in order to outlaw the use of offensive and defensive ASAT weapons systems and space-based conventional drone bombers.

III. ROADMAP

First, in framing a discussion on ASAT weapons systems, the predominance of satellite usage around the world will be assessed to underscore the criticality of satellites to global stability. Next, existing ASAT and space weapons systems will be examined to provide an understanding of the nature of their threat to IHL and the threat posed by space debris. This technology will then be examined in light of sources of international law relating to weapons in outer space, particularly the OST and sections of IHL found in Protocol I. As a comparative analysis, the customary international law with respect to chemical weapons will then be assessed to highlight how ASAT weapons could become universally conceptualized as an unacceptable form of warfare. This will serve to characterize ASAT missiles and space weapons as "weapons of mass destruction" under the scope of IHL, which will facilitate public discourse on the threat of space weapons to civilians.

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[7] Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), June 8, 1977, 1125 U.N.T.S. 3 [hereinafter Protocol I].

IV. BACKGROUND AND CONTEXT

The OST prohibits the placement of WMDs in Earth's atmosphere but, critically, does not prohibit the use or placement of conventional weapons in space.[8] Over the past five years, both China and the United States have tested ASAT missile weapons, respectively targeting and successfully destroying aging satellites located hundreds of kilometers above Earth.[9] Both of these states—along with India, Japan, and France—are alleged to have either developed the same ASAT missile deterrent capacity or possess the technological means to quickly produce this capacity (but have yet to test such a weapon).[10]

It is outer space—both with respect to human ambition and the application of IHL—that is indeed the "final frontier."[11] Just how the international community approaches the serious legal issues that are emerging from this new field of IHL will determine the very future of warfare, humanity's use of space, and the nature of global peace and stability.

A. GLOBAL PROLIFERATION OF SATELLITES AND EXPONENTIAL VULNERABILITY

Satellites have become a vital piece of infrastructure for a wide spectrum of daily life—particularly in the context of military operations and war. Global positioning systems (GPS), international handheld telecommunications, and high-speed global data transfer—all facilitated by exponentially more advanced spy and communications satellites—have inalterably changed the nature of combat and intelligence dissemination.[12] The satellite-linked globalized economy is currently more interconnected, interdependent, and intricately intertwined than at any other time in human history;[13] at the same time, it is more vul-

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[8] *See* Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies art. IV, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

[9] *See* SHIRLEY KAN, CONG. RESEARCH SERV., RS22652, CHINA'S ANTI-SATELLITE WEAPON TEST (2007); Michael W. Taylor, *Trashing the Solar System One Planet at a Time: Earth's Orbital Debris Problem*, 20 GEO. INT'L ENVTL. L. REV. 1, 10 (2007); SPACE SECURITY 2011, *supra* note 1, at 25.

[10] *See* David R. Sands, *China, India Hasten Arms Race in Space; U.S. Dominance Challenged*, WASH. TIMES, June 25, 2008, at A1.

[11] *Id.* (alluding to the iconic *Star Trek* introductory narrative).

[12] *See* SPACE SECURITY 2011, *supra* note 1, at 25.

[13] *See* Robert G. Joseph, Under Secretary for Arms Control & Int'l Sec., Remarks on the President's National Space Policy—Assuring America's Vital Interests (Jan. 11, 2007), *available at* http://2001-2009.state.gov/t/us/rm/78679.htm.

nerable to attack than ever before. This is particularly true in the context of emerging weapons systems like ASAT missile systems, which are specifically designed to target and destroy the very technology—satellites—that are literally connecting the world.

In the United States, "[s]atellites now function as essential links in . . . 'critical infrastructure'" and, furthermore, play a vital economic role with over "1100 corporations now exploit[ing] space in one way or another."[14] "Kazakhstan recently became the forty-seventh nation to undertake its own civilian space activities."[15] Notwithstanding the recent global economic downturn, the proliferation of space and satellite technology is unlikely to abate any time soon; global commercial space revenues now exceed $168 billion per year.[16] The value of direct U.S. investment in outer space is set to "soon reach half a trillion dollars, rivaling the size of U.S. capital investment in Europe."[17] The most recent statistics available indicate that approximately 1,071 operational satellites now orbit the Earth in an increasingly congested array,[18] particularly in routes deemed "most favorable"[19] for commercial operations. Given the exponential growth of smartphone use globally, satellites will continue to proliferate; similarly, the criticality of satellites to daily life will continue to grow for more people all over the world.

B. Assessing the Threat of ASAT Weapons: Statistics and U.S. Policy

In consideration of the centrality of satellites to modern life, some numerical statistics emphasize the emerging threat posed by ASAT weapons. According to the latest available assessments,

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[14] Koplow, *supra* note 4, at 1190–91; *see also* John E. Hyten, *A Sea of Peace or a Theater of War: Dealing with the Inevitable Conflict in Space*, ACDIS Occasional Paper 7 (2000), http://www.airpower.au.af.mil/airchronicles/apj/apj02/fal02/hyten.html.

[15] Koplow, *supra* note 4, at 1191; *see also* Space Security 2011, *supra* note 1, at 77.

[16] Space Security 2011, *supra* note 1, at 92 (claiming satellite industry revenues exceeding $168 billion in 2010); Koplow, *supra* note 4, at 1191 (claiming global space revenues exceeding $140 billion per year in 2009).

[17] Koplow, *supra* note 4, at 1191.

[18] *UCS Satellite Database*, Union of Concerned Scientists, http://www.ucsusa.org/nuclear_weapons_and_global_security/space_weapons/technical_issues/ucs-satellite-database.html (last updated Sept. 13, 2013).

[19] Koplow, *supra* note 4, at 1191.

the major world powers operate the following numbers of satellites:

- *United States*: Currently has 459 satellites in orbit, with 131 "known" military satellites and 117 used for other government purposes.
- *China*: Currently has a total of 105 satellites in orbit.
- *Russia*: Currently has a total of 110 satellites in orbit.
- *Rest of the world*: Currently operates a total of 397 satellites, significantly fewer than the United States alone operates.[20]

While the specific functions of military satellites are often highly classified, the nature of satellites in orbit is such that their orbital paths cannot be kept secret once they are launched.[21] This "exposed" reality means that nations' satellites are equally *un*protected in space and thus vulnerable to attack by ASAT weapons.[22] This is an important strategic reality that must be remembered throughout this assessment of how ASAT weapons systems impact the application of IHL. While some countries, such as the United States, possess a numerical advantage in terms of their total orbiting satellite population, this exposure means that those countries' infrastructures are arguably more open to ASAT or space-based weapons attack.

In light of this reality, the *New York Times* reported in 2005 that General Lance W. Lord, then-Commander of the U.S. Air Force Space Command (AFSPC), told an Air Force conference that "'[s]pace superiority is not our birthright, but it is our destiny. . . . Space superiority is our day-to-day mission. *Space supremacy is our vision for the future.*'"[23] This provocative statement acknowledges the simple fact that the United States controls the overwhelming majority of satellites in orbit around Earth. When combined with the world's increased reliance on satellites, the statement by General Lord also raises questions about how other countries intend to protect such vital pieces of their national infrastructure. To accomplish the goal of space supremacy, the United States created the AFSPC in 1982 as a distinct entity (one that is separate in control from the Air

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[20] *UCS Satellite Database*, *supra* note 18.

[21] *See* Koplow, *supra* note 4, at 1200.

[22] *Id.*

[23] Tim Weiner, *Air Force Seeks Bush's Approval for Space Weapons Programs*, N.Y. TIMES (May 18, 2005), http://www.nytimes.com/2005/05/18/business/18space.html (emphasis added) (quoting General Lance W. Lord).

Force) in recognition of the unique operational requirements of outer space.[24]

C. Composition of ASAT Weapons Systems

In a detailed examination of ASAT weapons and their potential implications for customary international law, David Koplow explains in easy-to-understand detail the main types of ASAT weapons and how they work, stating:

> The first is "kinetic energy" interceptors, relying on a physical object that suddenly shoots up from [E]arth and either collides with the target satellite, destroying it via high-speed impact, or approaches closely enough to blow up both itself and the target via a suicidal explosion.
>
> The alternative ASAT technology relies instead on "directed energy," such as a laser beam, a column of sub-atomic particles, radio-frequency transmissions, or a microwave generator. These gizmos could burn a fatal hole in the satellite's skin, temporarily and reversibly (or permanently) blind its sensors, or possibly employ cyber warfare to alter the satellite's on-board computers, switching it off or even commandeering it for the attacker's own uses.[25]

Along with these technologies, also under development are "co-orbital" ASAT systems, which are effectively mini-satellites that can be deployed by spacecraft and sent on missions to selectively destroy other satellites.[26] It is evident that countries are developing increasingly sophisticated means of denying an enemy's satellite technology.

D. The *X-37B* Orbital Test Vehicle: Space-Based Drone Bomber?

In addition to ASAT weapons systems, the United States is allegedly actively developing a so-called space bomber.[27] Dubbed the *X-37B* Orbital Test Vehicle (OTV), the space bomber is officially an unmanned vertical-takeoff, horizontal-landing (VTHL),

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[24] *Factsheet*, U.S. Air Force Space Command (Apr. 29, 2013), http://www.afspc.af.mil/library/factsheets/factsheet.asp?id=3649.

[25] Koplow, *supra* note 4, at 1201. Therefore, because directed energy ASAT systems do not destroy a satellite, they are described as non-kinetic-kill systems. *See id.*

[26] *See* Duncan Blake & Joseph S. Imburgia, *"Bloodless Weapons"? The Need to Conduct Legal Reviews of Certain Capabilities and the Implications of Defining Them as "Weapons"*, 66 A.F. L. Rev. 157, 176 (2010).

[27] *See* Burghardt, *supra* note 6.

reusable spaceplane.[28] While still under development, and likely at least a decade from deployment, the *X-37B* first launched into space aboard an *Atlas V* rocket in April 2010, "after more than ten years of development by Boeing Corporation's 'Phantom Works' black projects shop."[29] The spaceplane is a quarter of the size of the Space Shuttle and can stay aloft for nearly nine months, deploying solar panels for power.[30] More importantly for IHL, the spaceplane has a payload bay that might be able to deploy and retrieve small co-orbital ASAT mini-satellites or any number of weapons systems.[31]

The very clandestine development of the *X-37B* suggests its ultimate purpose is for missions beyond deploying co-orbital ASAT satellites and delivering materials to the International Space Station. Rather, as reported by the *New York Times*, analysts tracking the spaceplane noted its test flight trajectory passed over "global trouble spots, including Iraq, Iran, Afghanistan, Pakistan, and North Korea"; thus, the *X-37B* may be part of an experimental effort to develop sophisticated new surveillance systems.[32] The fact that the spaceplane was able to be publicly tracked[33] once more emphasizes the reality that future space-based weapons will operate from a level playing field—assuming their development is allowed by the international community.

E. Recorded ASAT Tests

While the threat posed by ASAT weapons cannot be overstated, the number of recorded tests of ASAT weapons is undeniably low.[34] As such, it is important not to create the false perception of a "global ASAT arms race" or any other sort of escalating scenario. As Koplow expresses, "Tests of satellite-killers in outer space have averaged approximately one per year since the space age began, but the vast bulk of [ASAT tests] occurred more than twenty-five years ago."[35] The end of the Cold War brought an abrupt halt to the need for the active develop-

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[28] *Id.*; *Is the X-37B Space Plane Spying on China?*, Mag Issue (Jan. 6, 2012), http://www.magissue.com/is-the-X-37b-space-plane-spying-on-china.html.

[29] Burghardt, *supra* note 6.

[30] William J. Broad, *Surveillance Suspected as Spacecraft's Main Role*, N.Y. Times (May 22, 2010), http://www.nytimes.com/2010/05/23/science/space/23secret.html?hp.

[31] *Id.*

[32] *Id.*

[33] *See id.*

[34] Space Security 2011, *supra* note 1, at 157.

[35] Koplow, *supra* note 4, at 1235.

ment of ASAT systems.[36] However, the rapid rise of China as a military and economic superpower over the last two decades is bringing renewed focus on ASAT technology—militaries intend to maintain a qualitative edge in the control of information, intelligence, and outer space itself.[37] "Since 1985 . . . depending on how one counts the ambiguous or incompletely documented cases," the numbers of recorded tests are as follows:

- "[O]ne kinetic [missile] interceptor test in space by the United States (in 2008)";
- "[O]ne high-energy laser ASAT test by the United States (in 1997)";
- "[F]our interceptor tests by China (in 2005–2007)";
- "[T]wo or three directed energy ASAT events by China (in 2006)"; and
- "[N]o tests of either sort by the Soviet Union or Russia. (There may have been additional instances of non-destructive tests that have not been publicly identified.)"[38]

Critically, with respect to IHL, "no [s]tate has ever used its ASAT system in hostilities or in a time of crisis against the spacecraft of another country."[39]

F. The Threat of Space Debris

There is another significant reason so few ASAT tests have been conducted: ASAT tests create hazardous debris in space. Over 16,000 space objects—mostly junk and debris—are currently being tracked by the U.S. Strategic Command.[40] In response to this threat, "the U.S. government has promulgated regulations for minimizing the creation of new orbital debris" in its National Space Policy; at the same time, "the commercial space industry has [started speaking] out against weapons tests . . . that could unnecessarily litter space with [thousands of pieces of] hazardous debris."[41] The explosion of an ASAT mis-

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[36] *Id.* at 1208–09.

[37] *See* Robert A. Ramey, *Armed Conflict on the Final Frontier: The Law of War in Space*, 48 A.F. L. Rev. 7, 141–43 (2000) (arguing that "[t]he space force structure represents a major component of the information infrastructure and will become increasingly important in deterring conflict and conducting future military operations").

[38] Koplow, *supra* note 4, at 1235.

[39] *Id.*

[40] *USSTRATCOM Space Control and Space Surveillance*, U.S. Strategic Command, http://www.stratcom.mil/factsheets/USSTRATCOM_Space_Control_and_Space_Surveillance/ (last visited Nov. 10, 2013).

[41] Koplow, *supra* note 4, at 1207–08.

sile creates a significant amount of space debris in Earth's orbit.[42]

An even more elemental assessment explains the central problem with conducting ASAT tests: "space debris does not discriminate" when it comes into contact with satellites.[43] Koplow explains: "Traveling at enormous orbital velocities (30,000 km/hr in low orbit), a chunk of random debris could obliterate an unlucky satellite."[44] American satellites are thus just as vulnerable to impact from debris caused by an American ASAT test as Chinese and Russian satellites.[45] Emphasizing the threat of space debris, in November 2011, astronauts aboard the International Space Station were nearly forced to enter the *Soyuz* escape capsule as a protection measure when debris from China's 2007 ASAT test passed "within a half-mile" of the international orbiter.[46] This close encounter also highlights the anthropogenic tragedy of space junk contaminating Earth's orbit.

G. Rise of Ground-Based "Directed Energy," Non-Kinetic-Kill ASAT Systems

While the lethality of space debris has discouraged ASAT missile tests, countries are not about to abandon ASAT weapons systems altogether; instead, many are actively developing ground-based laser "directed energy," non-kinetic-kill ASAT systems.[47] These laser systems are designed to negate the surveillance capabilities of satellites without destroying them, so the laser systems avoid the creation of space debris.[48] Air Force Undersecretary for Space Programs Gary Payton has explicitly "rejected [kinetic-kill] space weapons [such as ASAT missiles], stating that '[i]t would be hugely disadvantageous for the U.S. to get into that game.'"[49] Laser systems have reportedly been tested by China,

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[42] *Id.* at 1202–03.

[43] *International Space Law Panel*, 11 Whitehead J. Diplomacy & Int'l Rel. 7, 9 (2010).

[44] Koplow, *supra* note 4, at 1202.

[45] *International Space Law Panel*, *supra* note 43, at 25.

[46] Brian Vastag, *Debris Passes by Space Station Without Forcing Astronauts to Seek Shelter*, Wash. Post (Nov. 22, 2011), http://www.washingtonpost.com/national/health-science/astronauts-may-need-to-shelter-in-place-as-debris-nears-space-station/2011/11/22/gIQANAuCmN_story.html?hpid=z3.

[47] Space Security 2011, *supra* note 1, at 25.

[48] *See* U.S. Dep't of Defense, Space Control Technology, 0603438F, at 517 (2004), http://www.dtic.mil/descriptivesum/Y2005/AirForce/0603438F.pdf (Air Force RDT&E Budget Item Justification Sheet).

[49] Koplow, *supra* note 4, at 1208.

and these tests have included varying power levels to cause electronic disruption, minor surface damage, or significant electromagnetic damage to enemy satellite technology—all without firing a missile into space.[50] In contrast to ASAT missiles, which are obvious when launched, provocative in nature, and have the potential to be intercepted, ground-based laser ASAT systems are stealthy, nonintrusive, and, critically, do not create space debris. Their use is contentious nonetheless.

V. SOURCES OF LAW

With this background information, it is essential to assess the status of international treaty law and IHL as they relate to the weaponization of space.

A. THE OUTER SPACE TREATY

The Outer Space Treaty (OST), formally the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, was entered into force on October 10, 1967, and forms the basis of international space law.[51] To date, 102 countries are parties to the treaty, while another 26 have signed the treaty but have not completed ratification.[52] Writing in the *Harvard Law and Policy Review*, author Joanne Gabrynowicz notes that "[i]t was a scant ten months from the end of Outer Space Treaty negotiations to its entrance into force in 1967. . . . The speed with which the international community established this treaty regime demonstrates a clear intent that *space was to be governed by international law.*"[53] This is an important consideration with respect to this article's proposed international ban on ASAT missile systems and space weapons, set out later.

Among the OST's principles, state parties to the OST are barred from placing nuclear weapons or any other WMDs in orbit around Earth, installing them on the Moon or any other ce-

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[50] *See id.* at 1213.

[51] Outer Space Treaty, *supra* note 8.

[52] *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty)*, NUCLEAR THREAT INITIATIVE, http://www.nti.org/treaties-and-regimes/treaty-principles-governing-activities-states-exploration-and-use-outer-space-including-moon-and-other-celestial-bodies-outer-space-treaty/ (last visited Nov. 11, 2013).

[53] Joanne Irene Gabrynowicz, *One Half Century and Counting: The Evolution of U.S. National Space Law and Three Long-Term Emerging Issues*, 4 HARV. L. & POL'Y REV. 405, 422 (2010) (emphasis added).

lestial body, or otherwise stationing them in outer space.[54] The treaty further provides that "[o]uter space . . . shall be free for exploration and use by all [s]tates without discrimination";[55] that "[o]uter space . . . is not subject to national appropriation by claim of sovereignty . . . or by any other means";[56] and that "[s]tates . . . shall carry on their activities in the exploration and use of outer space . . . in accordance with international law, including the Charter of the United Nations."[57]

Notably, the OST does *not* prevent the stationing of conventional weapons (including conventional ASAT weapons) in space.[58] Article IV implies that the OST does not "affect a nuclear weapon that makes only a temporary transit of outer space, as when propelled by an intercontinental ballistic missile (ICBM) toward its target, rather than being 'stationed' in space."[59] However, as Major Bellflower notes in the *Air Force Law Review*, the "peaceful purposes" phrase in Article IV "engenders considerable debate over whether it should be interpreted to refer to 'non-military' or 'non-aggressive or non-hostile.' The United States has consistently taken the latter position."[60] Ultimately, the OST only bans weapons activities on the Moon and leaves unrestricted any imaginable non-nuclear activity (including weapons tests) in the space around Earth.[61] It is noteworthy that it took a full ten years after the launch of *Sputnik 1* for the international community to establish a treaty for the preservation of outer space.[62] With that said, Koplow notes that "many of the treaty's provisions, including most of the key 'constitutional' postulates that characterize the realm, had likely been established as [customary international law] well before 1967"; Koplow references successive United Nations (U.N.) General Assembly Resolutions on rules for the use outer space, such as the 1963 Outer Space Declaration.[63]

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[54] *See* Outer Space Treaty, *supra* note 8, art. IV.

[55] *Id.* art. I.

[56] *Id.* art. II.

[57] *Id.* art. III.

[58] Koplow, *supra* note 4, at 1198.

[59] *Id.*

[60] John W. Bellflower, *The Influence of Law on Command of Space*, 65 A.F. L. REV. 107, 128 (2010) (quoting Michael N. Schmitt, *International Law and Military Operations in Space*, 10 U.N.Y.B. 89, 101 (2006)).

[61] *See* Outer Space Treaty, *supra* note 8, arts. I–IV.

[62] *See* Gabrynowicz, *supra* note 53, at 405 (noting that the OST entered into force in 1967).

[63] Koplow, *supra* note 4, at 1233–35.

B. THE SPACE PRESERVATION TREATY

The Space Preservation Treaty (SPT) was presented to the U.N. in 2006 and sought to place a ban on all weapons and warfare in space.[64] The proposed treaty built on a 2001 U.N. General Assembly Resolution that declared:

> [T]he exploration and use of outer space . . . shall be for peaceful purposes and shall be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development . . . . [The] prevention of an arms race in outer space would avert a grave danger for international peace and security.[65]

However,

> [t]hree countries, most notably the United States of America, abstained from voting on most provisions of [the SPT] because the proposed treaty [allegedly] did not do enough to clearly define what is meant by a "space weapon," and therefore was open to wide interpretation and impossible to verify whether it was being violated.[66]

Discussed under the banner of the "Prevention of an Arms Race in Outer Space," the SPT was never ratified.[67] The SPT is representative of the difficulty likely to be encountered by a proposed treaty to ban ASAT weapons systems.

C. U.S. NATIONAL SPACE POLICY IN 2010 VS. 2006

Accordingly, the United States' current National Space Policy (as of 2010) does not explicitly preclude the development of weapons for use in space. The policy declares that:

> The United States will employ a variety of measures to help assure the use of space for all responsible parties, and, consistent with the inherent right of self-defense, deter others from interference and attack, *defend our space systems and contribute to the defense of allied space systems,* and, if deterrence fails, defeat efforts to attack them.[68]

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[64] Rangam Sharma & Sukhvinder Singh Dari, *Conflicting Sovereignty Issue in Outer Space: An Analysis of the Current Existing Conventions Vis a Vis Impediments and Challenges*, 1 INT'L ORG. SCI. RES. J. HUMANITIES & SOC. SCI. 14, 17 (2012).

[65] G.A. Res. 55/32, U.N. Doc. A/RES/5532 (Jan. 3, 2001).

[66] Sharma & Dari, *supra* note 64, at 17.

[67] G.A. Res. 61/58, U.N. Doc. A/RES/61/58 (Jan. 3, 2001).

[68] OFFICE OF THE PRESIDENT OF THE UNITED STATES, NATIONAL SPACE POLICY OF THE UNITED STATES OF AMERICA 3 (2010) [hereinafter U.S. NATIONAL SPACE POLICY 2010] (emphasis added).

This policy of "self-defense" would presumably include the right of the United States to shoot down enemy satellites or space-based weapons systems that threaten American space systems and satellites, and would arguably justify the use of ASAT weapons systems.

The Obama Administration's policy contrasts the space policy set out during the Bush Administration, which declared the following:

> The United States considers space capabilities—including the ground and space segments and supporting links—vital to its national interests. Consistent with this policy, the United States will: preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; take those actions necessary to protect its space capabilities; respond to interference; and *deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests.*[69]

Presumably, the Bush Administration's policy could have also deemed foreign satellites to be potentially "hostile to U.S. national interests," thus justifying the use of ASAT systems.[70] Arguably, the world's foremost satellite superpower has a significant national interest in protecting its 450+ satellites in orbit.[71]

VI. INTERNATIONAL HUMANITARIAN LAW AND ASAT WEAPONS

Until now, this article has focused on providing an objective assessment of ASAT weapons, including their development, types, and use, as well as the general law of outer space. All of this ties to the primary argument of this article and serves to frame an assessment of how IHL applies to ASAT weapons. This analysis is particularly relevant given that ASAT weapons have not been employed in combat to date. Through an assessment of IHL, it will become clear that the use of ASAT weapons and space-based drone bombers will negatively impact the application of IHL by reducing the ability of states to assess the proportionality, distinction, and military necessity of such attacks in the

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[69] OFFICE OF SCI. & TECH. POLICY, EXEC. OFFICE OF THE PRESIDENT, U.S. NATIONAL SPACE POLICY (2006) (emphasis added), *available at* http://www.fas.org/irp/offdocs/nspd/space.pdf.

[70] *See id.*

[71] *UCS Satellite Database*, *supra* note 18.

event of war. It is necessary, then, to critically analyze principles of IHL in order to appreciate this argument.

A. Additional Protocol I of the Geneva Convention

Additional Protocol I of the Geneva Convention (Protocol I) seeks "to reaffirm and develop the provisions [of the Geneva Convention] protecting the victims of armed conflicts."[72] Protocol I is the premier source of IHL within which ASAT weapons and space-based drone bombers can be assessed. Further, understanding how Protocol I applies will show how ASAT weaponry, when used in conjunction with coordinated cyber-attacks, has the potential to rapidly cripple vital civilian infrastructure and thus harm civilian populations, breaching various sections of Protocol I.

B. Article 35: "Basic Rules"—Unlimited Space Warfare?

Foremost, Article 35 of Protocol I establishes the "[b]asic rules" of armed conflict, and subsection 1 establishes that "the right of the [p]arties to the conflict to choose methods or means of warfare is not unlimited."[73] Moreover, of particular relevance to ASAT weapons is subsection 2, which sets out that states are "prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering."[74] The use of ASAT weapons in warfare would potentially constitute a violation of Article 35. If a state were to launch a full-scale, successful ASAT attack on an enemy's satellite network today, such an attack would also likely have a crippling effect on that country's civilian population. This attack would arguably breach Article 35(1) and (2) of Protocol I because (1) nearly every major civilian communication system today is dependent on satellites, and (2) many satellites serve both civilian and military purposes, bringing Article 52 of Protocol I into consideration as well (assessed later).[75] In sum, the consequences of a "simple" ASAT attack could potentially open up the prospect of "unlimited" warfare—the type of warfare sought to be barred under Article 35(1).[76] Furthermore, the offensive targeting of a country's complete satellite system

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[72] Protocol I, *supra* note 7.
[73] *Id.* art. 35(1).
[74] *Id.* art. 35(2).
[75] *See id.* art. 52.
[76] *See id.* art. 35(1).

could lead to a Cold War-era type of nuclear exchange. Given the likelihood of widespread damage, it is evident that a country attacked with ASAT weapons would have difficulty calculating a proportional response; if the scope or necessity of a response is miscalculated, this could create further instability.

To further understand this argument, consider the fact that modern society has exponentially increased its dependence on cell phones, GPS, and the internet, and therefore has developed a disproportionate dependence on the wireless technology that is facilitated by satellite communications, particularly in the developing world.[77] Attacks that target vital satellite communications systems could quite literally revert decades of progress in these developing countries. As such, even the successful destruction of a small percentage of a nation's satellite infrastructure could prove catastrophic for the basic functioning of a country because it would take years, if not decades, to restore the same satellite communications capacity assembled over many years of expensive satellite launches.

C. HYPOTHETICAL: U.S.–CHINA ASAT MISSILE EXCHANGE OVER TAIWAN

To help illustrate this point, consider the following hypothetical conflict. In the event of a conflict between the United States and China concerning Taiwan, it is possible that one of the most effective means of disadvantaging the enemy would be to completely destroy or disable its military communications system and cellular networks provided by satellites. The United States would seek to disable Chinese surveillance satellites over Taiwan, and similarly, China would seek to destroy the United States' surveillance and targeting capabilities. Disabling an enemy's GPS would nullify the targeting capabilities of numerous missile systems and greatly inhibit the ability to locate both friend and foe on the battlefield. It is also important to recognize that the use of ASAT systems in full-scale war would likely form just one component in an attack designed to cripple national infrastructure; the attack would also probably include cyber-attacks[78] designed to simultaneously destroy other essen-

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[77] *See* INT'L TELECOMM. UNION, MEASURING THE INFORMATION SOCIETY 1–4 (2011), *available at* http://www.itu.int/ITU-D/ict/publications/idi/2011/Material/MIS_2011_without_annex_5.pdf; Koplow, *supra* note 4, at 1190.

[78] *See* Jim Bronskill, *Ottawa Warned About Hackers Weeks Before Crippling Cyber Attack: CSIS Report*, GLOBE & MAIL (Oct. 30, 2011), http://www.theglobeandmail.

tial pieces of communications infrastructure. The use of ASAT systems in war would likely have a cascading, destabilizing effect on the global order. In the context of IHL, a successful attack that damages or destroys a country's communications systems would make it technologically and logistically difficult for that country to assess the circumstances surrounding the enemy's ASAT strike. This would make it extremely difficult to determine the appropriate scope of a military response.

D. Article 36: "New Weapons"

While ASAT weapons are not technically "new" weapons systems, the threat posed by the potential proliferation of ASAT systems is greater than ever due to global dependence on satellite communications systems. Moreover, the reality that many other countries (such as China) are actively developing ASAT capabilities raises concerns about the consequences of the use of ASAT weapons during warfare.[79] Article 36 of Protocol I establishes rules for "the study, development, acquisition or adoption of a new weapon, means or method of warfare," and specifically makes clear that countries are "under an obligation to determine whether [a new weapon's] employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party."[80] This "new weapons" provision is contentious with respect to IHL because of the absence in international law of an explicit prohibition on the weaponization of space. As such, the development and forward deployment of ASAT weapons systems today could contravene Article 36, given the presently unregulated standards on ASAT weaponry. The pressing need (assessed later) is for the international community to establish a treaty prohibiting the use of ASAT weapons—a treaty similar in nature to the chemical weapons ban—in order to outlaw the use of offensive ASAT weapons systems.

One aspect of ASAT weapon use that may fall under the purview of Article 36 is the ongoing development of ground-based laser ASAT systems, which have yet to be deployed in any known capacity.[81] As such, if a country possesses both missile and laser

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com/news/national/ottawa-warned-about-hackers-weeks-before-crippling-cyber-attack-csis-report/article2219129/.

[79] *See* Sands, *supra* note 10.

[80] Protocol I, *supra* note 7, art. 36.

[81] Koplow, *supra* note 4, at 1235–36.

ASAT systems, and both are equally effective at performing an ASAT mission, then the country should employ a "'necessity' standard [to] help dictate the choice between them. Specifically, if a laser ASAT is available, and is equally effective, then employment of the [missile-based] interceptor technology" (which creates hazardous space debris) "is no longer 'necessary.'"[82] Koplow succinctly notes, "Where a State can effectively neutralize an enemy's satellite via mechanisms that do not impose the persistent debris harm to the peaceful space activities of future generations of civilians and neutral States, . . . customary [IHL] would outlaw use of an interceptor."[83]

E. Distinction: Article 48 and Article 52(2): "General Protection Against Effects of Hostilities" and "Attacks Must Be Limited to Military Objectives"

Article 48 of Protocol I establishes the "General Protection" of the civilian population against the effects of hostilities, requiring that "[p]arties to the conflict shall at all times distinguish . . . between civilian objects and military objectives and accordingly shall direct their operations only against military objectives."[84] Because many civilian satellites can be "retained" for military objectives at the request of a government, such as in 2001 when the U.S. government purchased all commercial satellite imagery over Afghanistan to supplement its own spy surveillance,[85] the lines between civilian and military objectives are blurry when it comes to satellites. This unclear distinction makes adherence to Article 52(2) of Protocol I exceptionally difficult when a state considers deploying ASAT weapons.[86] Article 52(2) makes explicit that:

> Attacks shall be limited *strictly to military objectives.* In so far as objects are concerned, military objectives are limited to those objects which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a *definite military . . . advantage.*[87]

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[82] *Id.* at 1248.

[83] *Id.*

[84] Protocol I, *supra* note 7, art. 48.

[85] David Whitehouse, *US Buys Afghan Image Rights*, BBC News (Oct. 17, 2011), http://news.bbc.co.uk/2/hi/science/nature/1604426.stm.

[86] *See* Protocol I, *supra* note 7, art. 52(2).

[87] *Id.* (emphasis added).

However, in practice, the unclear distinction between civilian and military objectives may result in the creation of a deterrent effect against the use of ASAT weapons. Indeed, during the last few wars involving major powers—the 1991 Gulf War, the 2001 War in Afghanistan, the 2003 Iraq War, and Russia's 2008 War in South Ossetia—satellites were not targeted for attack.[88] However, in those cases, the major power's "one-sided technological edge[ ] obviated any reason to exercise weapons in space," and moreover, the "asymmetrical nature of each country's military assets and vulnerabilities provided little occasion to shoot at objects in space."[89] Nonetheless, the targeting of satellites that are used exclusively for military purposes can be theoretically justified under Article 52,[90] potentially leading to increased instability during combat.

In explaining how an ASAT attack may be justified, Koplow notes that the laws of armed conflict "[do] not prohibit all 'collateral damage' harm to civilians—that would probably be an impossible goal in any realistic military engagement—but it is axiomatic that force may lawfully be directed only at military objectives."[91] With respect to ASAT weapons, Koplow nonetheless emphasizes that a "weapon system that is inherently incapable of that degree of finesse . . . is illegal,"[92] such as a chemical weapon. Such weaponry has been banned because the user of the weapon cannot control "or even reliably predict" where the effects of the weapon may be felt; it thus fails to meet the standards set out in Protocol I.[93] In contrast, an ASAT weapon is quite discriminating and "is aimed with exquisite precision at a specific enemy satellite."[94] Indeed, "a whole [barrage] of ASATs would be steered by the most sophisticated guidance systems to [target] particular hostile spacecraft one by one."[95] This precision makes their utility more valuable in the eyes of military planners seeking to adhere to IHL.

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88 *See* Koplow, *supra* note 4, at 1236.

89 *Id.*

90 *See* Protocol I, *supra* note 7, art. 52.

91 Koplow, *supra* note 4, at 1244.

92 *Id.*

93 *Id.*

94 *Id.*

95 *Id.*

F. Article 51: "Protection of the Civilian Population"

Article 51 establishes that "civilians shall enjoy [the] general protection against dangers arising from military operations."[96] While this article generally applies to ground warfare and the threats posed by indiscriminate aerial bombardment, it can be argued that attacks on civilian satellites would represent an indirect targeting of civilian populations by disrupting components vital to life. Any sort of coordinated ASAT attack on cellular communications satellites would likely shut down emergency services and everyday business operations, and lead to a loss of life. The threat to civilians is made even greater in the event that ASAT attacks are launched alongside massive cyber-attacks that target other vital national infrastructure.

Koplow stresses that countries must consider the potential harm to civilians and the proportionality of the attack before utilizing ASAT weapons in combat.[97] With respect to IHL, he notes that "an ASAT operation—especially one that might spawn a persistent debris hazard—is vulnerable under this analysis."[98] However, before launching an ASAT operation, the "proportionality calculus" of military strategists would be intrinsically complicated by the fact that the military value of enemy satellites would be very high.[99] This is true given the reality that "a [modern] enemy force is heavily reliant on its satellites for reconnaissance, communications, [and] targeting" systems.[100] Moreover, for weaker nations with lesser satellite capabilities, such as Iran, Koplow suggests that if these countries possess "few alternative 'fallback' substitutes, then destruction of one (or a few) orbiters could carry a significant premium" for the aggressor employing ASAT weapons.[101] This reality makes the military necessity of ASAT weapon use particularly compelling in the heat of combat.

G. Article 56: "Protection of Works and Installations Containing Dangerous Forces"

In February 2008, the United States used a sea-launched ASAT missile to shoot down a non-functioning U.S. National Reconnaissance Office (NRO) satellite named *USA-193*, whose or-

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96 Protocol I, *supra* note 7, art. 51.

97 Koplow, *supra* note 4, at 1246–47.

98 *Id.* at 1246.

99 *Id.*

100 *Id.*

101 *Id.* at 1246–47.

bit was decaying by approximately 500 meters per day.[102] The U.S. government claimed that the primary reason for destroying the satellite was the approximately 1,000 pounds (450 kilograms) of toxic hydrazine fuel contained on board; officials were concerned about the resulting health and environmental risks[103] posed to persons in the immediate vicinity of the crash site should any significant amount survive re-entry into Earth's atmosphere.[104] Though critics allege that this American ASAT test was simply a response to China's 2007 ASAT test and had nothing to do with the threat posed to humans,[105] the test highlights the responsibilities of countries set out under Article 56 of Protocol I.[106] Article 56 lists strategic sites that contain "dangerous forces" that "shall not be made the object of attack, . . . if such attack may cause the release of dangerous forces and consequent severe losses among the civilian population."[107]

Though the threat of large civilian losses on the ground caused by ASAT attacks is likely minimal due to the fact that most satellite debris stays in orbit or burns up during re-entry, the reality is that satellites like *USA-193* are constructed out of toxic materials and pose an environmental threat upon being shot down over civilian populations. This is even truer when satellites are shot down in significant numbers during a full-scale ASAT attack intended to completely annihilate an enemy's satellite capacity. Given that Article 57 of Protocol I also requires states to take precautions to spare civilians before attacking,[108] IHL stresses the need to consider all the implications of ASAT strikes.

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[102] Angela Webb, *Joint Effort Made Satellite Success Possible*, U.S. AIR FORCE (Feb. 26, 2008), http://www.af.mil/news/articledisplay/tabid/223/article/124266/joint-effort-made-satellite-success-possible.aspx; *see U.S. Spy Satellite, Power Gone, May Hit Earth*, N.Y. TIMES (Jan. 27, 2008), http://www.nytimes.com/2008/01/27/us/27spy.html?em&_r=0.

[103] Suman Chowdhury, *Space Wars: Beginning of a New Era*, BRAHMAND.COM (Nov. 18, 2010), http://www.brahmand.com/news/space-wars-beginning-of-a-new-era/5524/3/15.html; *see also* Webb, *supra* note 102.

[104] *See* Chowdhury, *supra* note 103.

[105] *Id.*

[106] *See* Protocol I, *supra* note 7, art. 56.

[107] *Id.*

[108] *Id.* art. 57.

VII. COMPARATIVE ANALYSIS AND POLICY RECOMMENDATIONS

A. THE CHEMICAL WEAPONS CONVENTION BAN ON CHEMICAL WARFARE

The integral nature of satellites to modern life, the potential destabilizing effect of ASAT weapon use, and the unavoidable threat of space debris collectively legitimize a push toward a global ban on the use of ASAT weapons and space-based drone bombers. The precedent for such a ban has been set out by the Chemical Weapons Convention,[109] which is an important comparative analysis tool in considering a potential ban on conventional weapons in space. For decades, "[c]hemical weapons have been researched, developed, tested, manufactured, deployed, used, and retired by many countries in diverse settings," despite the fact that "public opinion has always recoiled [at the prospect of] chemical warfare."[110]

Some of the earliest arms control treaties, including the Brussels Declaration of 1874[111] and the Hague Conventions of 1899[112] and 1907,[113] were developed with these hated weapons in mind. By 1925, the Geneva Protocol achieved consensus on chemical weapons, with the parties declaring that

> the use in war of asphyxiating, poisonous or other gases . . . has been justly condemned by the general opinion of the civilized world . . . [to the end] that this prohibition shall be universally accepted as a part of International Law, binding alike the conscience and the practice of nations.[114]

The Chemical Weapons Convention, which entered into force in 1997,[115] was the culmination of decades of efforts to ban chemical weapons. But prior to that time, customary interna-

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[109] *See* Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction art. I, Jan. 13, 1993, 1974 U.N.T.S. 45 [hereinafter Chemical Weapons Convention].

[110] Koplow, *supra* note 4, at 12587.

[111] Project of an International Declaration Concerning the Laws and Customs of War (Aug. 27, 1874), *available at* http://www.icrc.org/ihl/INTRO/135.

[112] Convention with Respect to the Laws and Customs of War on Land, July 29, 1899, 32 Stat. 1803.

[113] Annex to the Convention Regulations Respecting the Laws and Customs of War on Land art. 23(a), Oct. 18, 1907, 36 Stat. 2277 ("[I]t is especially forbidden . . . [t]o employ poison or poisoned weapons.").

[114] Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, pmbl., June 17, 1925, 26 U.S.T. 571.

[115] Chemical Weapons Convention, *supra* note 109, at 317 n.1.

tional law had long established that chemical weapons were an especially horrific form of warfare, with numerous statements and resolutions from the U.N. General Assembly attesting to this.[116] Similarly, existing opposition to ASAT weapons and the weaponization of space could lead to the development of an ASAT and Space Weapons Ban. However, unlike chemical weapons, which merely comprised a type of ground weaponry that was obviously detrimental to basic human health interests, space weapons represent not only a new type of weaponry but also the vanguard of an entirely new theater of warfare. The feasibility of a space weapons ban may hinge on whether countries are willing to cede the exoatmospheric realm to the international collective.

B. Feasibility of an "Anti-Satellite and Space Weapons Ban"

Although a public revulsion to space weaponry may not exist in the same way that it does for chemical weapons, given the "bloodless" and largely experimental nature of space weaponry,[117] there are many reasons to believe that an "ASAT and Space Weapons Ban" may be a feasible international pursuit. Foremost, as established earlier in this article, the universal, indiscriminate threat of space debris created by ASAT explosions gives every country on Earth reason to oppose the potential weaponization of space. The accordant potential for widespread harm to civilian populations resulting from the destruction of satellites is a tangible global issue—one which could be persuasively argued in the appropriate international fora.

Second, the relative ease with which space-based weapons can be tracked by enemy powers, as evidenced by the publicly tracked U.S. *X-37B* "space bomber" test,[118] makes their usefulness marginal in comparison to more stealthy, non-space-based Air Force alternatives. While the qualitative military advantage offered by space-based weapons to the major military powers is undeniable, countries like the United States recognize that "arming the atmosphere" will likely lead to rival powers doing the same; these actions could easily escalate into a new arms

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[116] Question of Chemical and Bacteriological (Biological) Weapons, G.A. Res. 2603 (XXIV), U.N. GAOR, 24th Sess., Supp. No. 30, U.N. Doc. A/RES/2603(XXIV), at 16 (Dec. 16, 1969).

[117] Blake & Imburgia, *supra* note 26, at 159–60.

[118] *See* Broad, *supra* note 30.

race and destabilize the planet.[119] Finally, in the event of war, the reciprocal nature of an offensive ASAT missile exchange, combined with the immense costs and significant length of time needed to place new satellites in orbit, represents an intractable barrier toward the active deployment of ASAT systems internationally.

C. Parallels between the Chemical Weapons Ban and a Potential Space Weapons Ban

"The parallels between the chemical weapons [ban effort] in the twentieth century and the ASAT case in the twenty-first century are striking."[120] Koplow comprehensively details these parallels in his article on ASATs:

- [A] widely reviled weapon had earned significant international opprobrium, with experts and the knowledgeable public considering that form of combat to be shortsighted and reprehensible;
- [S]imultaneously, the weapons were recognized as powerful, potentially decisive in combat, or at least capable of greatly disrupting a country's planned military activities (and, perhaps, the weapons seemed to confer more advantage on an offensive attacker, with less utility for a defender);
- [T]he weapons had proliferated and threatened to spread further (while at the same time, the leading military powers (the United States, the Soviet Union/Russia, and in the case of ASAT, China) possessed by far the greatest inventories, experience, and capacity);

. . . .

- [T]he weapons were extremely imprecise and indiscriminate, with effects spreading unpredictably far from the intended targets, irresponsibly afflicting civilians and neutrals alike;
- [T]he effects of the weapons were notoriously persistent (some [chemical weapons] linger on, and around, the battlefield for a worrisome length of time—but nothing like the decades of danger posed by ASATs).[121]

It is therefore reasonable to believe that an ASAT and Space Weapons Ban is an achievable international objective. The hesi-

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[119] Steven M. Kosiak, Ctr. for Strategic & Budgetary Assessments, Arming the Heavens: A Preliminary Assessment of the Potential Cost and Cost-Effectiveness of Space-Based Weapons 3 (Oct. 31, 2007), *available at* http://www.csbaonline.org/publications/2007/10/arming-the-heavens-a-preliminary-assessment-of-the-potential-cost-and-cost-effectiveness-of-space-based-weapons/2/.

[120] Koplow, *supra* note 4, at 1262.

[121] *Id.*

tancy of countries to further test ASAT missile systems due to the space debris created also lends weight behind a push to ban these weapons altogether.

D. ASAT AND SPACE WEAPONS BAN DISCUSSIONS TO DATE

The United States recently entered into discussions with the European Union toward the development of an "agreement limiting the use of anti-satellite weapons," with the joint primary concern being the prevention of further debris creation in space.[122] However, apart from perennial non-binding U.N. General Assembly Resolutions toward the "Prevention of an Arms Race in Outer Space,"[123] there is no global movement toward a ban on the weaponization of space. As Koplow notes, part of the problem is "the sheer complexity of the issues, the multiplicity of national and commercial interests at play, and the range of competing priorities occupying negotiators' attentions."[124] Another major hurdle "has been the persistent inability of leading authorities in Washington, D.C. and Moscow to decide whether a system of mutual restraint, or a strategy of unilateral advantage-seeking, offers a better approach to security in space."[125] With that said, these challenges should not be viewed as insurmountable hurdles because the success of the Chemical Weapons Convention today emphasizes the ability of states to overcome differences in the pursuit of the greater good.

VIII. CONCLUSION

The use of ASAT weaponry in combat and the potential use of space-based drone bombers threaten to contravene IHL, cause widespread harm to civilian populations, and thus escalate conflicts; as such, the use of ASAT weapons should be treated like the use of WMDs. Given the nearly unstoppable advance of modern military technology, if space weapons are not banned, countries will be forced to build satellites equipped with countermeasures that destroy incoming ASAT missiles and, as a consequence, effectively guarantee the permanent weaponization of

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[122] *U.S., EU Eye Anti-Satellite Weapons Pact*, WASH. TIMES (Jan. 27, 2011), http://www.washingtontimes.com/news/2011/jan/27/us-eu-eye-anti-satellite-weapons-pact/?page=all.

[123] *See, e.g.*, G.A. Res. 63/40, U.N. Doc. A/RES/63/40 (Dec. 2, 2008); G.A. Res. 61/58, *supra* note 67; G.A. Res. 55/32, *supra* note 65.

[124] Koplow, *supra* note 4, at 1215.

[125] *Id.* at 1215–16.

space.[126] At that point, there exists only a small leap in logic between the prospects of satellites armed with missiles for *self-defense* to satellites (or space-bombers/orbiters) armed with missiles and bombs for *offensive* purposes. Further, the potential widespread use of stealthy ground-based ASAT lasers threatens to disrupt national satellite communications networks, which in turn threatens to cause massive civilian losses in war.

In summary, the weaponization of space offers a bleaker future, represents an abuse of modern technology, and steps unnecessarily into the unknown for all countries. International legal norms provide more-than-sufficient precedents for the creation of an "ASAT and Space Weapons Ban," as the assessment of the Chemical Weapons Convention exemplified. Weapons in space must be contained because the potential for disaster is enormous. Humanity's beneficial use of space has become too entrenched to passively allow weapons that in an instant could erase decades of peaceful development and coexistence.

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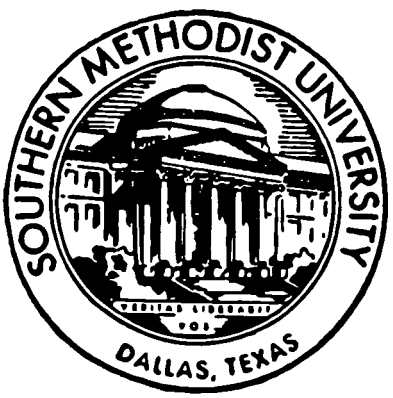
[126] *But see* LAURA GRECO, UNION OF CONCERNED SCIENTISTS, SHORT HISTORY OF US AND SOVIET ASAT PROGRAMS 8 (2003), *available at* http://www.ucsusa.org/assets/documents/nwgs/asat_history.pdf.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