Space Warfare and International Law: Emerging Legal Challenges in the Final Frontier

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On July 9, 1962, the United States detonated a nuclear warhead 400 kilometers above the Earth's surface.[1] This test aimed to study the impacts of a nuclear detonation in space on satellite surveillance, communications systems, and the "basic characteristics of a high altitude nuclear blast."[2] The test, known as Starfish Prime, resulted in a 1.4 megaton explosion, which was far more powerful than anticipated, causing unexpected havoc in the Earth's low orbit and on the surface. The blast created radiation belts which significantly damaged satellites in orbit, and as a result of the test seven satellites were destroyed within months of the detonation.[3] The explosion even destroyed a satellite that launched the day following the explosion, demonstrating how the radiation produced by Starfish Prime created lingering effects that could damage and destroy satellites over time.[4] Furthermore, the test caused physical damage to sites far away, including infrastructure in Hawaii located "800 miles from ground zero."[5]

The Starfish Prime test yielded two significant discoveries. First, the effects of nuclear detonations in space are extremely harmful to objects in Earth's orbit as well as on the surface. A year after Starfish Prime, the governments of the United States, the Soviet Union, and the United Kingdom signed the 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water.[6] The treaty, known as the Partial Test Ban Treaty, banned all above ground nuclear testing in response to growing public concern over the dangers posed by nuclear testing.[7] The second observation was that nuclear weapons were extremely effective at disabling satellites, prompting the United States to develop Program 437. This initiative kept two Thor ballistic missiles armed with nuclear warheads on standby to target enemy satellites.[8] Despite the major risks of detonating a nuclear warhead in space, the United States valued an effective satellite killer enough to accept those dangers. This blog will examine why the United States values an anti-satellite capability so highly as well as how anti-satellite (ASAT) weapons interact with

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[1] DEP'T OF DEF., *A "Quick Look" at the Technical Results of Starfish Prime* 1 (Aug. 1962), https://web.archive.org/web/20110117225158/http:/www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA955411&Location=U2&doc=GetTRDoc.pdf.
[2] *Id.* at 10.
[3] E.G. Stassinopoulos, *The STARFISH Exo-atmospheric, High-altitude Nuclear Weapons Test*, NASA/GODDARD SPACE FLIGHT CTR. (Apr. 22, 2015).
[4] *Id.*
[5] Charles N. Vittitoe, *Did High-Altitude EMP Cause the Hawaiian Streetlight Incident?*, 3, (1989).
[6] Nat'l Archives, *Test Ban Treaty (1963)*, https://www.archives.gov/milestone-documents/test-ban-treaty (last visited Mar. 7, 2024).
[7] *Id.*
[8] *See* CLAYTON K. S. CHUN, *Shooting Down a "Star": The US Thor Program 437, Nuclear ASAT, and Copycat Killers*, College of Aerospace Doctrine Research and Education Paper No. 6(2000), https:/spp.fas.org/military/program/asat/ADA377346.pdf.

international law. Finally, this blog will examine the issues created by ASAT weapons and why a strong international legal framework is necessary to safeguard the planet from these weapons.

During the Cold War, the United States and Soviet Union's struggle for dominance would see the two sides compete economically and militarily in space. The competition created a world today where economies, societies, and militaries are reliant on space-based technologies. Critical technologies like the internet, GPS, and certain communication techniques need satellites to function properly. Furthermore, militaries use satellites for the collection of intelligence, surveillance, and reconnaissance (ISR), secure communications, and a host of other critical functions. Satellites "have become deeply integrated into conventional warfare, where they enable precision strikes, drone operations, missile warnings, and more."[9] In the Russo-Ukrainian war, "space systems have greatly enhanced battlefield awareness, information sharing, and precision, but they have also been vulnerable to electronic and cyber warfare."[10] In a war between great powers, satellites play a vital role. Military planners theorize that a "Space Pearl Harbor" — targeting satellites—is a potential way for a country to cripple an adversary's military and engage a rapid offensive.[11] This underscores the critical role of satellites in modern warfare and highlights why nations pursue ASAT weapons.

Since satellites and ASAT weapons will likely play a decisive role in the next major conflict, it is important there is an international legal framework that can govern the use of these technologies. Customary international law (CIL) provides a framework that can regulate and limit the use of ASAT weapons, however, it is not comprehensive. CIL arises from the consistent conduct of countries over time.[12] So far, treaties and arms control agreements "have been largely impotent" in preventing the weaponization of space.[13] CIL provides a "viable alternative pathway toward enhancing space security and impeding the development and use of ASATs" instead of the outdated and ineffective treaties that govern military activities in space.[14] There is an objective and a subjective element. The objective element concerns finding "a widespread, longstanding pattern of concordant state practice."[15] While the subjective element attributes that pattern of state practice with "'sense of obligation,' rather than merely to habit, courtesy, indifference, or political expediency."[16] An important feature of CIL is that it can create binding law "on all States, even

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[9] RON GURANTZ, *Satellites in the Russia-Ukraine War* 1 (2024).
[10] *Id.*
[11] COMMISSION TO ASSESS U.S. NAT'L SEC. SPACE MGMT. & ORG., 107TH CONG., REPORT OF THE COMMISSION TO ASSESS UNITED STATES NATIONAL SECURITY SPACE MANAGEMENT AND ORGANIZATION at viii (Comm. Print 2001).
[12] David A. Koplow, *ASAT-isfaction: Customary International Law and the Regulation of Anti-Satellite Weapons*, 30 MICH. J. INT'L L. 1187, 1188 (2009). *See also* RESTATEMENT (3D) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102.2 (Am. Law Inst.1987) ("CIL arises from "from a general and consistent practice of states, followed by them from a sense of legal obligation.").
[13] NANCY GALLAGHER & JOHN D. STEINBRUNER, *RECONSIDERING THE RULES FOR SPACE SECURITY* 7–12 (2008) (describing early efforts to establish a regime of restraint regarding military use of space).
[14] Koplow*, supra* note 12, at 1189.
[15] Koplow*, supra* note 12, at 1232.
[16] *Id.*

those that did not participate in the emerging pattern."[17] This demonstrates how powerful CIL can be due to its ability to bind parties to conduct even if they are not in favor of that particular obligation. CIL is a "leading well-respected source of international law, fully on par with treaties," which the International Court of Justice and Federal Courts in the United States rely on to create obligations for state conduct.[18]

Despite the value in ASAT weapons, there has been little ASAT testing since the end of the Cold War and an ASAT weapon has never been used in active hostilities.[19] Only four countries (the United States, Russia, China, and India) have demonstrated a willingness and ability to test ASAT weapons.[20] This lack of activity makes it hard to create obligations out of CIL. Furthermore, none of these three countries have ever indicated anything other than "sheer national policy" has governed the use or testing of ASAT weapons.[21] When these countries "criticize each other's ASAT experiments," they use language that suggests that the testing is "unwise" or "unsafe," however, they avoid calling them illegal.[22] While states that have generally "refrained from testing or using ASAT devices" likely satisfy the objective element of CIL, the subjective element is likely missing. States do not seem to refrain from using or testing ASAT weapons out of a sense of obligation, instead they do so because they do not have the ability or willingness to invest heavily in such a specialized weapons program.

Some states disagree, however. India, has called ASAT testing a violation of international law. In 2008, the chair of the Indian Space Research Organization said that while India could test an ASAT weapon, it has not done so because "India adhered to international norms on the peaceful use of outer space."[23] This statement occurred after China tested an ASAT weapon in 2007. Despite this statement, the test began "a process of re-evaluation of Indian ASAT policy."[24] This re-evaluation culminated in 2019 when India tested an ASAT weapon on a defunct satellite. India's turnaround on ASAT weapons demonstrates that countries are willing to support the legality of ASAT weapons and tests if they feel threatened by an adversary. India and China enjoy a tumultuous relationship and India's concern over being left behind in the race to militarize space compelled the Indian government to change its policies and positions regarding ASAT weapons and testing. India's ASAT test undermines the idea that CIL would support the banning of ASAT tests. India's ASAP test is amongst many others from other states, indicating that states still see

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[17] *Id.* at 1229.
[18] *Id*. at 1222.
[19] *Id*. at 1235.
[20] Christopher J. Borgen, *Russia's Alleged Nuclear Anti-Satellite Weapon: International Law and Political Rhetoric, Lieber Institute* in Articles of War, LIEBER INST. FOR L. & WARFARE AT WEST POINT (Jul. 31, 2024), https://lieber.westpoint.edu/russias-nuclear-anti-satellite-weapon-international-law/.
[21] Koplow*, supra* note 12, at 1237.
[22] *See* Jack Beard, *Russia's Nuclear Anti-Satellite Weapon and International Law* (Apr. 25, 2024), LIEBER INST. FOR L. & WARFARE AT WEST POINT, https://lieber.westpoint.edu/russias-nuclear-anti-satellite-weapon-international-law/.
[23] Koplow*, supra* note 12, at 1241.
[24] Rajeswari Pillai Rajagopalan, *India's Changing Policy on Space Militarization: The Impact of China's ASAT Test,* INDIA REVIEW, Nov. 10, 2011, at 367.

ASAT testing as a viable state practice. On the other end, in 2022, American President Joe Biden committed "not to conduct destructive, direct-ascent [ASAT] missile testing, and that [it] seeks to establish this as a new international norm for responsible behavior in space." Nevertheless, it seems unlikely that courts would hold that ASAT testing is illegal under CIL.

While CIL may not outright ban the testing and use of ASAT weapons, the laws of armed conflict (LOAC), produce binding obligations on states concerning the use of ASAT weapons in an armed conflict. The LOAC embrace both treaty and customary law and help guide the use of ASAT weapons in armed conflict. Three longstanding pillars of customary international law of armed conflicts that are particularly relevant to ASAT weapons are distinction, proportionality, and necessity. Distinction is the idea that "a military force may legitimately target only military objectives."[25] Proportionality prevents a military from using force "that would inflict excessive damage on noncombatants, when compared to the direct, concrete military advantage gained from the action."[26] Finally, necessity only allows militaries to conduct attacks "that are indispensable in securing the prompt submission of the enemy."[27] These principles guide and restrict the use of ASAT weapons in war.

Distinction does not outlaw all collateral damage; however, the attack must be directed at a legitimate military target. This principal is often "expressed in terms of the ability to aim the weapon in question."[28] Furthermore, a state that uses a weapon in an indiscriminate manner would violate the principle of distinction.[29] In sum, a weapon system that cannot be aimed, with sufficient precision, at a legitimate military target or that is used in an indiscriminate manner is illegal. ASAT weapons, particularly ASAT missiles, risk violating the principle of distinction, because the debris from the interception could damage both military and civilian satellites. Pieces of debris move? so fast in orbit that anything larger than a centimeter "can severely damage or destroy a satellite."[30] The effects of an ASAT missile strike linger "far longer, [spread] far wider, and [inflict] far more extensive harm to non-belligerents then chemical or biological weapons ever have" and would certainly be seen as a violation of the principle of distinction.[31]

The principle of proportionality applies to ASAT weapons in a similar way. When a military anticipates that an attack will cause civilian collateral damage, "the attacker must pause to assess the comparative value of those two factors."[32] Since ASAT weapons produce a high chance of civilian collateral damage, their use in armed conflict would require this analysis every

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[25] Koplow*, supra note* 12, at 1243.
[26] *Id.*
[27] *Id.*
[28] Michael N. Schmitt, *The Principle of Discrimination in 21st Century Warfare*, 2 YALE HUM. RTS. & DEV. L.J. 143, 147 (2014).
[29] *Id.* at 148.
[30] DAVID WRIGHT, *DEBRIS IN BRIEF: SPACE DEBRIS FROM ANTI-SATELLITE WEAPONS* 2 (2008).
[31] Koplow*, supra note* 12, at 1245.
[32] *Id.* at 1246.

time ASAT weapons are engaged. The lingering, long-term effects of an ASAT attack "could be disruptive to the peaceful space activities of many users over an extended period," demonstrating the immense civilian cost associated with an ASAT strike. This, however, does not mean that the use of an ASAT weapon always violates the principle of proportionality. With how reliant modern militaries are on satellites, is it possible that a court could assign a high military value to the target. Due to these variables, any examination of the use of ASAT weapons in the context of the principle of proportionality would need to be evaluated in the specific circumstances of the attack. While the principle of proportionality may not necessarily ban the use of ASAT weapons, the obligation for states to assess the proportionality of an attack increases the cost of using an ASAT weapon, potentially deterring states from employing them in an armed conflict.

Finally, the use of ASAT weapons likely does not violate the principle of necessity. It would be easy for a state to say that attacking an adversary's satellites was "indispensable in securing the prompt submission of the enemy."[33] The principal, however, would require a state to use the least destructive ASAT method possible to achieve this objective. For example, picture a state that possesses two ASAT weapons: one is an ASAT missile that would explode a satellite into a debris field and the second is a direct energy ASAT weapon that would merely disable a satellite while leaving it in orbit. This state, under the principle of necessity, would be required to use the direct energy weapon in order to minimize collateral damage.[34] The principle of necessity provides meaningful restrictions that can limit collateral damage done by necessary ASAT strikes.

As warfare spreads to space, it is important for international legal frameworks to regulate the militarization of space. While an international treaty governing and restricting the use of ASAT weapons would be preferable, international customary law applies meaningful restrictions on the use of these weapons. As global tensions rise and great power competition increases, it is more likely than ever that an ASAT weapon will be used in an act of force. The international community should be ready to enforce accountability upon any state that violates customary international law with an ASAT weapon.

[33] *Id.* at 1247.
[34] *Id*. at 1248.