The International Law for Outer Space Security: A Critical Overview Viewing ASATs

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Abstract

Anti-Satellite (ASAT) weapons have been a serious challenge to international space security for a long. However, despite offering serious space security concerns, ASAT tests are not banned by existing laws on outer space. This paper highlights the need for establishing new legislation for ASAT weapons while critically evaluating the existing space security legislation and the treaties being negotiated. It is also discussed that the lack of consensus among space-faring states is casting a dark shadow on the ongoing efforts to have new agreements to ensure space security. The paper further evaluates the ideas of a comprehensive ASAT test ban and the efficacy of a limited ASAT test ban. The methodology used in this paper is descriptive-analytical. The paper also emphasises the requirement to build consensus among states as a way forward to achieve the final objective of formulating a verifiable, multilateral ASAT agreement.

Keywords: Outer Space, ASAT, Missile, Space, Launch.

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Introduction

Although International Law for outer space encourages and promotes the peaceful uses of outer-space, the existing and emerging space technologies are increasingly being employed for military applications. The first satellite was launched by the Soviet Union in October, 1957.[1] Since then, militaries heavily rely on satellites for their planning, reconnaissance, targeting and communication. Military uses of outer space are generally categorised as "peaceful uses" even when they are not truly peaceful e.g. using satellites to coordinate direct bombing attacks or for the execution of a "prompt global strike" which involves the capability to manage any situation or neutralise any adversary during military operations.[2]

In contrast, the term "space weaponisation" typically refers to the deployment of space based devices capable of causing destruction. However, ground based devices and systems having the ability to target space based assets are also considered as space weapons, even though they are not positioned in space.[3] Similarly, on October 31, 2023, the Israeli Arrow-2 system intercepted a missile launched by Houthi rebels from Yemen at an altitude of approximately 100 km. Both the weapons (the targeted Houthi missile and the Israeli interceptor) were fired from the ground. The fact may be taken as the first incident of combat in space considering the altitude of interception.[4] The altitude of 100 km above sea level is considered as the point where Earth's atmosphere ends and outer-space starts. The point is called the Kármán Line.[5]

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[1] "The Launch of Sputnik, 1957," https://2001-2009.state.gov/r/pa/ho/time/lw/103729.htm, accessed June 15, 2024.
[2] "Outer-Space: Militarization, Weaponization and Prevention of an Arms Race in Outer Space," https://www.reachingcriticalwill.org/images/documents/Resources/Factsheets/outerspace.pdf.
[3] "Outer-Space: Militarization, Weaponization…"
[4] Ajey Lele, "Power Politics Transcends Space Security," June 3, 2024, https://www.thespacereview.com/article/4804/1, accessed June 4, 2024.
[5] "The Kármán Line: Where does space begin?" November 14, 2022, https://www.space.com/karman-line-where-does-space-begin, accessed February 10, 2024.

There are numerous categories of space weapons i.e. Kinetic Energy Weapons (KEWs) such as missiles or aircraft designed to hit targets in space; Directed Energy Weapons (DEWs) such as lasers being utilised to target satellites; electromagnetic weapons such as Radiofrequency (RF) weapons, nuclear biological, and chemical weapons etc. Furthermore, space technologies like space launch vehicles, small satellites, satellites as weapons platforms, information technology, and active debris removal systems offer dual-use services that can also add to the weaponisation which includes both kinetic and non-kinetic forms of attack.[6]

With the advancement of new technologies, the weaponisation of outer space has emerged as a major concern for the international community for casting a dark shadow on international peace and stability and for offering a new arena for arms competition, especially among space-faring nations. Increased weaponisation is also likely to heighten the level of conflict and may lead to a full-fledged war. [7]

Although space weapons are not merely limited to ASAT weapons in the contemporary era, this paper is limited to the critical evaluation of the challenges presented by ASAT weapons and their tests. The paper covers the inadequacy of existing space law for tackling the menace of ASAT weapons. The paper further evaluates the agreements that are still under discussion at international forums. The paper also discusses the way forward to have a ban on ASAT tests followed by a conclusion.

The ASAT Challenge

In June 2024, *Look Up Space* identified 10,019 active satellites, a major chunk of these satellites (9,254) is in LEO (mainly between 400 to 1200

[6] J. Pražák, "Dual-use conundrum: Towards the weaponization of outer space? *Acta Astronautica* (2021), doi: https://doi.org/10.1016/j.actaastro.2020.12.051, aaccessed February 10, 2024.

[7] Rabbia Bashir, "Understanding Space Weaponization and its Implications on Global Security," April 17, 2023, https://stratheia.com/understanding-space-weaponization-its-implications-on-global-security/, accessed Feb 10, 2024.

km from the Earth).[8] Nowadays satellites are playing a critical role in many spheres. They are essential for coordinating relief efforts following natural disasters, aiding in supply planning, airlifts, rescue operations, and medical assistance. For example, they were instrumental in November 2005, (following the earthquake in Pakistan) and in December 2004, (following a tsunami that devastated India, Indonesia, Malaysia, Sri Lanka, and Thailand).[9]

International as well as domestic economy, particularly of the US, heavily relies on satellites for quick financial transactions, environmental studies, communications, navigation, and tracking devices. Satellites can also provide crucial information on planetary health such as ozone depletion, increasing temperatures, glacier and polar icecaps diminution, soil erosion, deforestation, and predicting famines. In the case of military operations, satellites are being utilised for communication, navigation, intelligence-gathering, targeting, and early warning. They also help armed forces to minimise the collateral damage.

The use of weapons in outer space endangers all these activities to a very large extent. Satellites are difficult to hide, which makes them vulnerable. Space-faring nations can acquire or develop means to target satellites. These states are developing kinetic and non-kinetic Anti Satellite (ASAT) systems.

In addition to specifically designed anti-satellite systems, missile defense capabilities of states may also serve anti-satellite purposes having technical similarities with anti-satellite capabilities leading the warfighting in space. At present there are four countries that have conducted ASAT tests: the United States, Russia, China, and India.

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[8] Joshua Faleti, "Look Up Space Reports More Than 10,000 Active Satellites in Orbit," June 21, 2024, https://spacewatch.global/2024/06/look-up-space-reports-more-than-10000-active-satellites-in-orbit/, accessed August 10, 2024.

[9] Ross Liemer and Christopher F. Chyba, "A Verifiable Limited Test Ban for Anti-satellite Weapons," *The Washington Quarterly*, 33:3 (July 2010). https://cchyba.scholar.princeton.edu/sites/g/files/toruqf3881/files/cchyba/files/liemerchyba_twq_2010.pdf. 152.

The United States: The US military conducted the world's first test of ASAT in October 1959.[10] The US always endeavoured to maintain its technological monopoly in outer space throughout the Cold War as it is believed to have tested such weapons 34 times during the Cold War.[11] The US conducted its most recent test of ASAT in February 2008.

USSR/Russia: The USSR initiated research on ASAT systems around the 1960s and tested prototype device in 1967.[12] Till 1982, the USSR had conducted ASAT tests 20 times based on co-orbital methods.[13] Recent Kinetic ASAT tests by Russia involve direct ascent technologies instead of a co-orbital approach. The PL-19 Nudol missile, developed for missile defense purposes, is capable of hitting a satellite in Low Earth Orbit (LEO) in much less time than a Co-orbital ASAT.[14] Other Surface to Air Missiles S-300 and S-400 have the capability of "near space" activities.[15] Russia's upcoming S-500 system is also projected to reach altitudes of up to 600 km.[16]

In recent years, Russia has focused on laser-based ASAT systems. Russian reports announced the development of laser ASAT weapons to be fixed on its Beriev A-60 jet that can not only dazzle and blind satellite sensors but can also potentially damage other light or heat sensitive

[10] Liemer and Chyba, "A Verifiable Limited Test Ban for Anti-satellite Weapons," 152.
[11] Michael Krepon and Samuel Black, "Space Security or Anti Satellite Weapons?" *Stimson Space Security Project,* (May 2009) https://www.files.ethz.ch/isn/103310/ Stimson_Space_Booklet_2009.pdf . 22.
[12] Liemer and Chyba, "A Verifiable Limited Test Ban for Anti-satellite Weapons," 152.
[13] Todd Harrison, Kaitlyn Johnson and Thomas G. Roberts, "Space Threat Assessment 2018," *The Report of the CSIS Aerospace Security Project,* (April, 2018) https://aerospace.csis.org/wp-content/uploads/2018/04/Harrison_Space ThreatAssessment_FULL_WEB.pdf. 13. (Accessed: August 17, 2019).
[14] Harrison, Johnson and Roberts, "Space Threat Assessment 2018". 14.
[15] Harrison, Johnson and Roberts, "Space Threat Assessment 2018". 14.
[16] Harrison, Johnson and Roberts, "Space Threat Assessment 2018". 14

segments of a satellite.[17] Russia conducted its latest Direct Ascent ASAT test on November 15, 2021.[18]

Russia's recent launch of Cosmos 2576 on May 16, 2024, is being considered by the US as a "weapon" capable of launching other satellites in space. Experts are apprehensive that this could be an inspector satellite which appears to be following a US spy satellite.[19]

China: After the US and Russia, China has emerged as one of the leading space faring nations in the world with the ASAT capability. China initiated research on Anti-Satellite (ASAT) weapons in the 1970s, and commenced the development of a kinetic energy weapon in the 1980s. Between 2004 and 2007, China is assumed to have conducted one test of a kinetic ASAT weapon annually, with only the 2007 test successfully hitting the target.[20] Regarding China's May 2013 missile defense test, experts have speculated this to be a high altitude direct ascent ASAT test having capability to reach satellites in Geo-Synchronous Orbit (GEO).[21] China is also believed to test DN-3 ASAT missiles that can hit satellites in higher orbits and reportedly conducted non debris producing tests in October 2015, December 2016, August 2017, and February, 2018.[22]

Besides kinetic ASATs, China has also made noteworthy advancements in non-kinetic ASAT weapons. According to the US Director of National Intelligence, China's progression in directed energy technologies can

[17] Harrison, Johnson and Roberts, "Space Threat Assessment 2018," 15.
[18] Jaganath Sankaran, "Russia's Anti Satellite Weapons: An Symmetric Response to US Aerospace Superiority," *Arms Control Today*, March 2022. https://www.armscontrol.org/act/2022-03/features/russias-anti-satellite-weapons-asymmetric-response-us-aerospace-superiority#:~:text=Russia%20conducted%20a%20direct%2Dascent,1%2C500%20pieces%20of%20orbital%20debris.&text=Reacting%20to%20the%20test%2C%20U.S.%20Space%20Command%20commander%20Army%20Gen, accessed July 23, 2024.
[19] Ajey Lele, "Power Politics Transcends Space Security"…
[20] Liemer and Chyba, "A Verifiable Limited Test Ban for Anti-satellite Weapons," 153
[21] Harrison, Johnson and Roberts, "Space Threat Assessment 2018," 8.
[22] Harrison, Johnson and Roberts, "Space Threat Assessment 2018," 8.

either blind or damage sensitive space based optical sensors, used for remote sensing or missile defense.[23]

India: India joined the ASAT arms race with the conduct of its ASAT test on March 27, 2019.[24] India's ASAT test was hardly a surprise for those, who were aware of the fact that India has been developing Ballistic Missile Defense (BMD) System from the early 2000s.

There are overlaps in BMD and ASAT technology. Even a poor or prototype anti-ballistic missile defense system could be an excellent ASAT.[25] The fact of the matter is that a country that can develop an effective BMD system can also develop ASAT weapons as both the technologies are linked with each other at different stages. The course of a missile reentry vehicle, while outside the atmosphere is satellite orbit alike; the peak order of 1,000 km and the velocity is slightly suborbital.[26] There is great overlap and similarities between the midcourse BMD system and ASAT weapons. Since the ASAT and BMD technologies are closely related, the BMD system provides an ASAT breakout capability to a state.

Subsequently, a state can develop offensive ASAT technology under the pretext of developing a so-called defensive BMD system without any hindrance. So, the development of a BMD system by a state is threatening to the space-based assets of other space-faring nations as it can be considered as a potential attacker in outer-space.

ASAT technologies are giving birth to multiple security and safety challenges in space. Firstly, ASAT tests itself undermine space security by

[23] Harrison, Johnson and Roberts, "Space Threat Assessment 2018," 8.
[24] A. Vinod Kumar, "India's ASAT Test: Joining the Arms Race in Outer-Space?" *IDSA Comment*, March 28, 2019, https://idsa.in/idsacomments/india-asat-test-vkumar-28-0319.
[25] "ASAT, BMD and the 1972 ABM Treaty," *Arms Control in Space: Workshop Proceedings*, (May 1984), 35, https://swh.princeton.edu/~ota/disk3/1984/8404/840409.PDF.
[26] "ASAT, BMD and the 1972 ABM Treaty," 35.

invigorating an arms race in outer space and amplifying not merely the fears but also increasing the possibilities of preemption in outer-space. The history of ASAT tests suggests that the US ASAT tests became a stimulus for the Russian and Chinese ASAT tests. India has also tested its ASAT under the pretext of being threatened from Chinese ASAT technology. In future, if the development of such weapons is not capped then other space-faring countries would also be inclined to develop such technologies in one way or another, thereby, encouraging an arms race of space weaponisation.

Secondly, these tests pose severe safety hazards to space activities through the creation of space debris. Space debris is the terminology that refers to the "junk" left in space as a result of various activities in space. Defunct satellites, rocket stages, nose cones, payload covers, shrouds, bolts, solid propellant slag, space activity castaways, deterioration fragments and fragments from exploding batteries, fuel tanks and collisions, all create junk in the outer-space.[27] The issue here is that a crash with even a tiny piece of debris may potentially lead to the damage or destruction of a satellite and also may injure astronauts.[28] Each piece of debris moves at 17,500 mph in space, which can collide with any satellite in orbit and can produce more debris.[29]

The menace of space debris is well acknowledged. ASAT tests rank high in creating space debris out of all the activities being done in space.[30] It is estimated that the debris produced as a result of the destruction of merely single large satellite is equal to the amount of debris generated as a result

[27] Jack M. Beard, "Soft Law's Failure on the Horizon: The International Code of Conduct for Outer Space Activities," U. Pa. J. Int'l L, Vol. 38:2. (2017), https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1936&context=jil , 340, accessed August 10, 2024.

[28] Beard, "Soft Law's Failure on the Horizon: The International Code of Conduct for Outer Space Activities," 340.

[29] Dave Mosher, "India's anti-satellite missile test just moved humanity closer to a space-junk nightmare scenario," March 27, 2019, https://www.businessinsider.com/india-missile-shoots-down-satellite-space-debris-junk-risk-2019-3.

[30] Beard, "Soft Law's Failure on the Horizon: The International Code of Conduct for Outer Space Activities," 417.

of eighty years of regular space activities conducted under strict debris mitigation rules.[31] In addition, at present, there is no legally binding international agreement banning the testing of ASAT weapons.[32] The absence of legally binding international agreement is providing an open road to space-faring states to conduct ASAT tests in space, unfortunately.

An Overview of Existing Legislation for Outer-Space Security

As far as the International Space Law is concerned, it was initiated in the 1950s, quickly developed in the 1960s and 1970s, and took shape at the end of the 1970s. The International Space Law encompasses the Outer Space Treaty (1967), The Rescue Agreement (1968), The Space Liability Convention (1972), The Registration Convention (1975) and the Moon Treaty (1979). These treaties have powerful impacts and all the prominent countries engaged in space activity have signed all these treaties. Out of all the five treaties, only the Outer Space Treaty is the cornerstone of the existing space security regime.

Besides Outer Space Treaty that provides binding obligations to its State Parties, there are some other legal instruments in the form of a draft treaty on the Prohibition of Placement of Weapons in Outer-Space (PPWT), International Code of Conduct for Outer Space activities,[33] unilateral moratoria on ASAT testing by the US and other states, and the UN Resolution (A/RES/77/41) adopted in December 2022, in favour of the destructive DA-ASAT moratorium.[34] Following is the discussion as to how existing legal mechanisms are inadequate to deal with the issue of ASAT weapons.

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[31] Beard, "Soft Law's Failure…"417.
[32] Beard, "Soft Law's Failure…"417.
[33] "Draft International Code of Conduct for Outer-Space Activities," Version March 31, 2014, https://www.eeas.europa.eu/sites/default/files/space_code_conduct_draft_vers_31-march-2014_en.pdf.
[34] Ching Wei Sooi, "Satellite Missile Tests: State Positions on the Moratorium, UNGA Resolution, and Lessons for the Future," October 2023, https://swfound.org/media/207711/direct-ascent-antisatellite-missile-tests_state-positions-on-the-moratorium-unga-resolution-and-lessons-for-the-future.pdf, accessed: 10 February, 2024.

The Outer-Space Treaty (OST) 1967

As mentioned earlier, the treaty that provides the primary basis for outer space security is the Outer Space Treaty (OST). The OST is considered to be the cornerstone of the space security regime. The treaty acknowledges the right to explore space for peaceful purposes.[35] According to Article IV of the treaty, it is prohibited to place nuclear weapons or any other kinds of weapons of mass destruction in outer space.[36]

The fact is that the treaty has shortcomings in many areas. Firstly, the treaty entered into force in October 1967, and therefore it is the oldest of all the outer space security treaties.[37] Being the decades-old treaty, it requires up-dating in many areas as the treaty does not incorporate many of the new technological developments of today's world that can undermine space security. For example, the treaty does not prohibit conventionally armed space-to-space weapons and space to Earth Weapons.[38]

The treaty seems to be silent in the backdrop of a number of technical realities of today's world that are damaging to international space security, including anti-satellite technologies themselves and overlaps in BMD and ASAT technologies. Secondly, the treaty lacks definitional clarity since its time of conclusion. For example:

1. The OST does not identify the boundary between airspace and outer space. This issue is particularly significant while countries can assert sovereignty over airspace, they cannot do so over outer-space as outlined in Article I of the treaty. The lack of agreement on the exact altitude where national airspace ends and outer-space starts raises

[35] "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies," https://2009-2017.state.gov/t/isn/5181.htm.
[36] "Treaty on Principles Governing…"
[37] "Treaty on Principles Governing…"
[38] Todd Harrison, "International Perspectives on Space Weapons," CSIS Aerospace Security Project Report, May 2020, https://aerospace.csis.org/wp-content/uploads/2020/05/Harrison_IntlPerspectivesSpaceWeapons-compressed.pdf.

doubts about the ability of the OST to prevent claims to regions in Low Earth Orbit.[39]

2. The concept of "peaceful purposes" (as mentioned in Article IV) in the OST is also debatable and is circumvented, especially in the case of dual-use technologies. An example is the development of space propulsion technologies which support the development of nuclear weapon delivery systems. A case in point is India's development of Agni-I missile developed by Indian rocket scientists who were employed earlier for the development of space launch vehicles. As of now, the Agni missile series is India's largest nuclear-capable missile series developed out of this cooperative work.[40]
3. There is no agreed-upon definition of a "space weapon." In the absence of a precise definition, the policy of 'what is not prohibited is legal' is followed by the stakeholders whether these are states or private corporations.

PPWT 2008

The international community recognises the need for a treaty that may be effectively able to meet new challenges posed by the development of new types of space weapons as a result of the development of technology and shortcomings in the existing legislation To address the shortcomings in international space law, the matter is subject to debate in the Conference of Disarmament (CD) in the form of a Draft Treaty on the Prevention of Placement of Weapons in Outer Space and of Threat or Use of Force against Outer-space Objects (PPWT).[41]

The Draft Treaty on the Prohibition on the Placement of Weapons in Outer Space and of the threat of use of Force against the Outer Space

[39] Declan Tevyaw, "Failures and Successes of the Outer-space Treaty of 1967 in Relation to Modern Space Policy," October 31, 2023 https://ace-usa.org/blog/foreign-policy-region/space-oceans-and-polar-regions/failures-and-successes-of-the-outer-space-treaty/.
[40] Tevyaw, "Failures and Successes…"
[41] Fobio Tronchetti, "Preventing the Weaponization of Outer Space: Is the Chinese-Russian-European Common Approach Possible," *Space Policy*, 27:2, (May 2011), 85. https://doi.org/10.1016/j.spacepol.2011.02.001.

Objects (PPWT) was jointly submitted to the CD by China and Russia in February 2008, to prevent the weaponisation of the outer space.[42]

The PPWT has the provisions which ensure that the treaty cannot be interpreted as impeding the right of states to explore the outer-space and to exercise their inherent right of self-defense.[43] Fortunately, the PPWT also contains the definition of weapons in outer-space.[44] Still the treaty is not without shortcomings. Some shortcomings in the PPWT have been identified as below:

1. The treaty does not address ground-based ASATs. The PPWT allows research, development, production, and terrestrial storage of ASATs and does not ban their testing and development.[45]
2. The PPWT does not categorise dual-use systems as space weapons.[46]
3. The treaty does not offer a verification mechanism which affects the treaty's capacity to prevent the weaponisation of outer space.[47]
4. Although the treaty has shortcomings, it is considered to be offering a good starting point for the negotiations on a new convention prohibiting the weaponisation of outer space and is cherished by many delegates in the CD.[48] However, the United States' opposition to the treaty diminishes the chances of success of the treaty.[49]

Just like other arms control and disarmament measures, space legislation is also one of the serious victims of power politics and the national interests of stakeholder states. On the other hand, the Chinese-Russian 2008 draft Treaty presented in the CD fairly demonstrates the willingness of the international community despite its shortcomings.

[42] Tronchetti, "Preventing the Weaponization of Outer Space." 84
[43] Tronchetti, "Preventing the Weaponization of Outer Space." 84.
[44] Tronchetti, "Preventing the Weaponization of Outer Space." 84.
[45] Tronchetti, "Preventing the Weaponization of Outer Space." 84.
[46] Tronchetti, "Preventing the Weaponization of Outer Space." 84.
[47] Tronchetti, "Preventing the Weaponization of Outer Space." 84.
[48] Tronchetti, "Preventing the Weaponization of Outer Space." 84.
[49] Tronchetti, "Preventing the Weaponization of Outer Space." 84.

The ICOC 2008:

The draft International Code of Conduct for Outer Space Activities was initially introduced by the European Union (EU) during the French Presidency.[50] EU Member States agreed to the first draft in June 2008, which was prepared earlier in 2007.[51] This EU Draft Code of Conduct was formally presented to the international community in December, 2008.[52] Though no non-EU state signed the EU draft, it was agreed to use it as a foundation for negotiations on an international Code of Conduct.[53] Interested nations outside the EU were requested to provide a feedback and participate in the international expert meetings which led to the publishing of the revised versions of the Code in September 27, 2010, June 5, 2012, and, on September 16, 2013.[54] The last draft Code of Conduct came on March 13, 2014. It is considered as the International Code of Conduct for Outer Space Activities (stated as "ICOC" or the "Code").[55]

The main objective of the ICOC was to introduce voluntary "rules of the road" to ensure peaceful uses of outer space by the states.[56] ICOC as a 'soft law' is subject to criticism concerning its capacity in dealing with security-related matters.

Firstly, even though ICOC addresses civilian and military activities, it is a soft law instrument without entailing any legal obligations.[57] Therefore, it is being taken as a case study of a soft law holding limitations in tackling

[50] Chris Johnson, "Draft Code of Conduct for Outer Space Activities Fact Sheet," February 2014, https://swfound.org/media/166384/swf_draft_international_code_of_ conduct_ for_outer_space_activities_fact_sheet_february_2014.pdf.
[51] Johnson, "Draft Code of Conduct…"
[52] Johnson, "Draft Code of Conduct…""
[53] Johnson "Draft Code of Conduct…"
[54] Johnson, "Draft Code of Conduct."
[55] Beard, "Soft Law's Failure on the Horizon: The International Code of Conduct for Outer Space Activities," 343.
[56] Johnson, "Draft Code of Conduct..."
[57] Tronchetti, "Preventing the Weaponization of Outer Space," 85.

military activities in a vulnerable space environment.[58] The soft law approach is not as effective in dealing with the hardcore military affairs that the ICOC is tackling as a legally-binding instrument could be.[59]

Secondly, the code does not define the key concepts' definitions. For example, the concept of *peaceful purposes* has remained vague and it appears that drafters of the code have deliberately done so for the broad acceptance of the code.[60] The code has used the term *harmful interference* in Section 2, (third hyphen), and Section 5 (first hyphen) harmful interference is considered when it *generates long-lived space debris*.[61] This may lead to the interpretation that the Code of Conduct allows the ASAT test in case it does not generate long-term space debris.[62]

This factor of non-defining the key definitions related to space security, perhaps had simplified the discussions on the text of the ICOC. It has resulted in vague interpretations and applicability.[63] So when it comes to the issue of addressing ASATs, the problem here is ASAT weapons and BMD systems share nearly the same set of technologies. In this situation, an unclear and broad legal instrument does not address the issue precisely but creates further confusion.[64]

Lastly, there is also the issue of lack of consistency in the guidelines of the code. For example, Article 4.1 of the ICOC mentions specific debris mitigation guidelines while Article 4.2 softens them by tolerating the

[58] Beard, "Soft Law's Failure on the Horizon: The International Code of Conduct for Outer Space Activities" 344.
[59] Beard, "Soft Law's Failure…"344.
[60] Ajey Lele eds., *Decoding the International Code of Conduct for Outer Space Activities*, (New Delhi: Pentagon Security International, 2012), 91.
[61] Ajey Lele eds, *Decoding the International Code of Conduct for Outer Space Activities*, 91.
[62] Ajey Lele eds, *Decoding the International Code of Conduct for Outer Space Activities*, 92.
[63] Tronchetti, "Preventing the Weaponization of Outer Space: Is the Chinese-Russian-European Common Approach Possible," 85.
[64] Beard, "Soft Law's Failure on the Horizon: The International Code of Conduct for Outer Space Activities," 415.

damage and destruction of space objects unless such action is justified by the Charter of the United Nations, including the inherent right of individual or collective self-defense.[65] This leads to the provision of a sort of legitimacy to the use of ASAT weapons under self-defense. As a result, states may be encouraged to develop ASATs in order to use them in 'self-defense.'

Unilateral Moratorium on ASAT Testing (2022):

Following a Russian ASAT test in November 2021, the US took lead in announcing unilateral moratorium on the testing of destructive ASAT tests on April 12, 2022, as a step to create international norms and to develop a momentum.[66] Following the US declaration seven other states announced their commitment formally to support the US-led initiative.[67] In the same year, Canada announced its moratorium in May, New Zealand in July, Japan and Germany in September and UK and South Korea in October. Whereas, France and Ireland announced their support to the initiative but did not make any commitment.[68]

It is ironic that the states that have not developed nor expressed their intent to develop ASAT technologies ever, became part of the initiative.[69] Whereas, China, Russia and India, the states that have demonstrated the possession of the ASAT weapons, have not made any such commitment.[70] The unilateral ban by the US is now being considered as an arms control concession since it has not been reciprocated by the key international players of ASAT testing.[71] In that sense, the idea of the announcement of

[65] "Draft International Code of Conduct for Outer-Space Activities."
[66] Michael J. Listner, "Two Years after the Test Ban: A Realistic Assessment," https://globalsecurityreview.com/two-years-after-the-asat-test-ban-a-realistic-assessment/, accessed August 10, 2024.
[67] "Seven Countries Join ASAT Test Ban," *Arms Control Today*, November, 2022, https://www.armscontrol.org/act/2022-11/news-briefs/seven-countries-join-asat-test-ban#:~:text=The%20United%20States%20became%20the,and%20South%20Korea%20in%20October, accessed August 10, 2024.
[68] "Seven Countries Join ASAT Test Ban."
[69] Listner, "Two Years after the Test Ban: A Realistic Assessment."
[70] Listner, "Two Years after the Test Ban: A Realistic Assessment."
[71] Listner, "Two Years after the Test Ban: A Realistic Assessment."

the Unilateral Moratorium does not appear to be productive. Furthermore, a test ban by the US vis-à-vis Kinetic ASAT is merely rhetorical and symbolic. A unilateral moratorium is simply a voluntary declaration of a state, and it may come out of the moratorium any time without facing any legal ramifications. So, the purpose of banning ASAT through voluntary declarations is not likely to be served.

The UN Resolution (2022):

During the 77th Session of the UN General Assembly's First Committee on Disarmament and International Security, a resolution in support of the DA ASAT, testing moratorium was adopted.[72] The resolution was championed by the US which announced the ASAT testing moratorium earlier in April 2022, following a Russian ASAT test in November 2021.[73] China, India, and Russia-- key players in ASAT technology—did not support the resolution.[74] China voted against the resolution while arguing that a moratorium has less practical value than a comprehensive agreement such as PPWT.[75] Russia also voted against the resolution and asserted that only a legally binding agreement on PAROS can maintain peace in space and expressed the necessity of a purely legal approach that complies with the existing laws.[76] India abstained from the resolution while preferring a legally binding instrument and remain open to non-binding outcomes.[77]

Since the resolution is non-binding, it is not likely to yield the results that a space regime with the legally binding mechanism may achieve, yet the resolution cannot be under-valued. Some analysts view that mere

[72] Heather Foye and Gabriela Rosa Hernandez, "UN First Committee calls for ASAT Test Ban,"*Arms Control Today*, December, 2022 https://www.armscontrol.org/act/2022-12/news/un-first-committee-calls-asat-test-ban#:~:text=A%20key%20UN%20panel%20formally,satellite%20(ASAT)%20missile%20tests, accessed July 15, 2024.
[73] Foye and Hernandez, "UN First Committee calls for ASAT Test Ban."
[74] Foye and Hernandez, "UN First Committee calls for ASAT Test Ban."
[75] Sooi, "Satellite Missile Tests: State Positions on the Moratorium, UNGA Resolution, and Lessons for the Future," 23
[76] Sooi, "Satellite Missile Tests: State Positions on the Moratorium," 24
[77] Sooi, "Satellite Missile Tests: State Positions on the Moratorium," 30

consideration of the legal status of UNGA resolution leads to a narrow view point. These resolutions have symbolic value and political impact as they form the opinion of the international community.[78] Furthermore, UNGA resolutions impact International Law. Such resolutions are helpful in filling the gaps in International Law. For Example, in 1961, the UNGA passed a resolution on the peaceful uses of outer-space and two years later UNGA passed a declaration on the Legal Principles Governing the Activities of the states in the Exploration and Use of Outer-Space. In the following 10 years, three multilateral treaties entered into force incorporating the provisions of these resolutions.[79]

Most recently, in April 2024, political tactics were again employed by major powers in UNSC when Russia vetoed the US-Japan resolution aimed at the prohibition of the placement of nuclear weapons in outer space. This was followed by the voting against the resolution proposed by Russia and China that sought to prohibit member states from deploying any type of weapon in outer space.[80] This is indicative of the fact that till the time the main players of outer space do not agree, a constructive outcome concerning space security is not likely to happen.

So, the point here is that the menace of ASAT weapons that international security is facing will ultimately be dealt with by the hard law that delegitimises ASATs. The guidelines of soft law may contribute to this objective but not the objective itself.

International Law and Anti-Satellite Weapons

As there is no treaty in the existing space law regime that bans testing and use of ASAT weapons, all the military activities in outer space, including the use of ASATs, follow the rules of general public International Law

[78] Celine Van Den Rul, "Why Have Resolutions of the UN General Assembly If They Are Not Legally Binding?", June 16, 2016, https://www.e-ir.info/pdf/64272, accessed October 5, 2024.
[79] Den Rul, "Why Have Resolutions of the UN General Assembly If They Are Not Legally Binding? *Political Science*, 2020.
[80] Ajey Lele, "Power Politics Transcends."

and the UN Charter, nevertheless.[81] Article 2(4) of the UN Charter prohibits states from the use of force and the threat of the use of force.[82] This principle is also interpreted by the International Court of Justice (ICJ) as binding upon all states as a principle of International Customary Law.[83] This appears to be prohibiting the use of ASATs by a state against the satellites of other state.[84]

However, under the Article 51 (Chapter VII) of the UN Charter, force can only be used under individual or collective self-defense with the authorisation of the UNSC.[85] Therefore, any act of the use of force or threat of the use of force (even against the satellites of the other state) will be considered unlawful if the UNSC has not mandated. [86] Some international legal scholars, such as Fawcett, are of the view that no provision of Article 51 of the UN Charter or Customary International Law entails an upper limit above the surface of the Earth on the exercise of the right to use force to ensure self-defense.[87] If no upper limit is considered by International Law for its applicability, then various principles of the International Law of Armed Conflict would also be considered in a situation of conflict in space:

1. The principle of discrimination: refers to the adherence of the distinction between the combatants and non-combatants and the use of force should only be against legitimate military objects. In the case

[81] C. Kwan, L. Lindström, D. Giovannelli, K. Podiņš, D. Štrucl (Eds.), "CyCon 2024: Over the Horizon 16th International Conference on Cyber Conflict," (Tallinn: NATO CCDCOE Publications, 2024,), 253.
[82] Lindström, Giovannelli, Podiņš, Štrucl (Eds.), "CyCon 2024: Over the Horizon 16th International Conference on Cyber Conflict," 253
[83] Promit Chatterjee, "Legality of Anti-Satellites under the Space Law Regime," *Astropolitics: The International Journal of Space Politics and Policy,* March 2014, 12:1, 27-45, DOI: 10.1080/14777622.2014.891558, 33.
[84] Chatterjee, "Legality of Anti-Satellites under the Space Law Regime." 33.
[85] Lindström, Giovannelli, Podiņš, Štrucl (Eds.), "CyCon 2024: Over the Horizon 16th International Conference on Cyber Conflict," 253
[86] Lindström, Giovannelli, Podiņš, Štrucl (Eds.), "CyCon 2024: Over the Horizon 16th International Conference on Cyber Conflict," 253
[87] Chatterjee, "Legality of Anti-Satellites under the Space Law Regime," 33.

of ASAT, the issue of dual-use satellites offering civil and military services is an issue of discrimination.

2. The principle of proportionality: mandates that the use of force should not cause excessive damage on non-combatants. This principle legally challenges ASAT weapons as a significant amount of debris is created as a result of the use of ASAT weapons that may endanger peaceful outer space activities.[88] Nonetheless, satellites may still be attacked if proportionality element is addressed (by using non-kinetic ASATs).[89]
3. The principle of necessity requires that force will only be used when indispensable to the military objectives. This principle also challenges the requirement of the use of ASAT weapons in the presence of Earth-based warfare systems. In case, kinetic and non-kinetic ASAT are available to the state then criteria of necessity would entail the employment of non-kinetic ASAT systems to avoid hazardous space debris.[90]

The above discussion reveals that the established principles of International Law do not offer specific provisions pertaining to ASAT weapons. The UN Charter or Customary International Law are unable to cater the consequential effects of the application of one aspect of law. Furthermore, these principles apply only in case of conflict situations and remains irrelevant to the testing phase of ASAT weapon.[91] In such a scenario, the requirement of a treaty comprehensively addressing the issue of Anti-Satellite weapons is the need of the hour.

[88] Chatterjee, "Legality of Anti-Satellites under the Space Law Regime," 34.
[89] Lindström, Giovannelli, Podiņš, Štrucl (Eds.), "CyCon 2024: Over the Horizon 16th International Conference on Cyber Conflict," 254.
[90] David A. Koplow, "ASAT-isfaction: Customary International Law and the Regulation of ASAT Weapons," *Michigan Journal of International Law,* Summer 2009, Vol. 30:11187, 1248.
[91] Koplow, "ASAT-isfaction: Customary International Law and the Regulation of ASAT Weapons," 1243

A Partial ASAT Test Ban v/s Comprehensive ASAT Test Ban

To deal with the challenges posed by Anti Satellite (ASAT) tests in space, the international community is hoping to develop an effective instrument that exclusively bans ASAT tests. Whether a comprehensive test ban is a suitable approach to ensure international space security and sustainability or a partial test ban is the suitable one, considering the prevailing international security environment, has emerged as an important point of discussion in the pursuit of imagining a suitable legal mechanism to somehow ensure outer space security and sustainability.

A comprehensive ASAT Ban refers to a multilateral, legally binding agreement, prohibiting all types of ASAT tests including KE ASATs, DEWs, and space mines etc. As far as a Limited/Partial ASAT test ban is concerned, different proposals on the nature and specifications of a limited ASAT test ban have been introduced at different levels as an initial step, considering the precedent of the 1963 Limited Test Ban Treaty (LTBT) on nuclear explosive tests. To figure out suitable legislation for space security, it is very important to contemplate and assess the efficacy of these proposals vis-à-vis comprehensive ASAT tests. These are technically different proposals that support the case for limited ASAT test ban:

1. *A Ban on KE ASAT Weapons:* A ban on KE ASAT weapon testing that creates a significant amount of debris was initially proposed by the Bruce W. MacDonald in 2009, who is a former Director for National Security at the White House Office of Science and Technology Policy. He advocated that such a ban would be instrumental in discouraging states to conduct research and development of KE ASAT weapons.[92] Furthermore, such a ban would reduce the reliance of major states in a conflict situation on KE ASAT weapons. [93]On technical grounds, this limited ban was in

[92] Mark A. Gubrud, "Chinese and US Kinetic Energy Space Weapons and Arms Control," *Asian Perspective*, 35 (2011) 629.
[93] Gubrud, "Chinese and US Kinetic Energy Space Weapons," 629.

conformity with the recent UN resolution on announcement of the unilateral moratorium on the KE ASAT testing.

The problem here is that this ban would only address a single type of ASAT weapons. In today's world, there are several efficient ways to partially harm or completely damage satellites. Electronic interference, cyber-attacks, Directed Energy Weapons (DEWs) repurposing of satellites in the orbit are the modern techniques that states may develop and adopt.[94] Subsequently, a ban on kinetic energy ASAT weapons is likely to air the apprehension that it would give impetus to research and development of non-kinetic ASAT systems. Besides, the situation for space security will not improve. Furthermore, the issue of secure space operations continues to exist. Nonetheless, a ban on KE ASAT is not entirely useless because it will ban debris-producing weapon testing in outer space.

2. *Ban on approaching other Spacecraft at Excessive Speeds:* This proposal is presented by Geoffery Forden, who is a research associate with the Science, Technology, and Society Program at the Massachusetts Institute of Technology. According to Fordon, comparative speed between the interceptor and the satellite is critical in defining the intricacy of guidance and control systems of ASAT weapons, therefore, addressing the speed and distances of space systems may stop collisions in space.[95] Forden's proposal falls in the category of a limited ASAT ban as it covers high-speed KE ASATs only, and does not cover space mines that the Soviets tested in the 1980s.[96]
3. *Ban on High Altitude ASAT Tests:* Another technically sophisticated proposal is banning high altitude ASAT tests but allowing debris-

[94] TH Anand Rao, "A Voluntray Kinetic ASAT Test Ban is Merely Symbolic," February 2, 2023, https://capsindia.org/a-voluntary-kinetic-asat-test-ban-is-merely-symbolic/, accessed August 9, 2024.

[95] Geoffery Forden, "After China's Test: Time for a Limited Ban on Anti Satellite Weapons," *Arms Control Today*, 37:4 (2007). 1. https://www.armscontrol.org/act/2007-04/features/after-chinas-test-time-limited-ban-anti-satellite-weapons.

[96] Geoffery Forden, "After China's Test: Time for a Limited Ban on Anti Satellite Weapons," 1.

producing ASAT tests below the agreed altitude.[97] Such a ban is proposed to serve three main objectives. Firstly, at low altitudes debris fragments are considered to be short-lived, therefore, the issue of space debris would be addressed.[98] Secondly, a country with the ability to intercept a high-speed satellites orbiting below 300 km would be certain to hit the slow-moving satellites at high altitudes.[99] Lastly, as BMD tests are conducted below 230 km altitude, a high-altitudes ASAT test ban would not halt the BMD testing.[100]

The problem here is the proposal that defines the ASAT test-altitude limit of 250-300 km. It is likely to legitimise the debris-producing ASAT test at this altitude.[101] It is evident from the fact that banning nuclear weapon test in atmosphere, in outer-space and underwater through 1963 Partial Test Ban Treaty (PTBT), did not reduce the testing but only shifted the underground nuclear weapons tests space.[102]

If we compare both the approaches i.e. limited ASAT test ban and comprehensive ASAT test ban one finds out that:

1. A Limited test ban only focuses on the issue of space debris whereas a complete ASAT test ban deals with the issue of space security to a considerable extent by completely banning ASAT tests.
2. A complete test ban makes the ASAT tests legally questionable but on the other hand, a limited test ban seems to be not only adjusting and compensating but also encouraging ASAT tests by allowing the ASAT tests at low altitudes.
3. The verification mechanism under the complete test ban lies on the notion that 'existing ASAT tests verification regime cannot prevent tests but it verifies that whether they are happening or not' so it bans all kinds of ASAT tests. On the other hand, a limited test ban is based

[97] Liemer and Chyba, "A Verifiable Limited Test Ban," 154.
[98] Liemer and Chyba, "A Verifiable Limited Test Ban," 154
[99] Liemer and Chyba, "A Verifiable Limited Test Ban," 154
[100] Liemer and Chyba, "A Verifiable Limited Test Ban," 154
[101] Gubrud, "Chinese and US Kinetic Energy," 631.
[102] Gubrud, "Chinese and US Kinetic Energy," 631.

on the notion that 'sudden breakout capability of states (provided by the development of BMD systems) would be impossible to detect under any realistic verification regime, thereby, it allows ASAT tests at a specified altitude.

4. Whether it is the complete ASAT test ban or limited ASAT test ban, both the proposals are exempting the development of BMD systems, which provides the breakout capability of ASAT tests to its possessing states.

The Way Forward

The above discussion shows that there is neither suitable legislation nor are there any other suitable proposals at hand to achieve the objective of comprehensive space security. No doubt, the world is serious towards adequate space legislation but this seriousness is eclipsed by individual interests of states. Russia and China have shown their commitment by presenting the PPWT draft but the progress on this issue is stopped due to US opposition, which makes the conclusion of the treaty, even with modifications addressing its shortcomings, impossible at least in the near future. Besides PPWT, there is no other proposal which may be able to offer a plausible mechanism.

In order to develop a suitable space law, it is plausible to conceive the space scenario having space security for all the states. Space security can only be achieved in the international environment when all the following conditions are present.

- Ban on ASAT tests along with an adequate verification mechanism.
- Declaration by states that ASATs shall not be used during the time of crises.
- Existence of Outer-space Confidence Building Measures CBMs.
- Defining Status of the BMD as a stabilising or de-stabilising technology.
- Addressing the shortcomings of existing legislation.

All the above mentioned points together present an ideal scenario for space security. Following steps could be taken by the international community in this regard:

1. There can be points over which states can build consensus e.g. states can agree on the confidence-building-measures at bilateral, trilateral and multilateral levels. So, those points which can achieve an easy consensus with little diplomatic effort can be negotiated and concluded in the form of multilateral agreements.
2. It is not necessary that a single agreement should incorporate all those features that ensure the security of outer-space objects. A series of multilateral agreements can be negotiated with a single point agenda simultaneously. That would demonstrate at least some kind of success as some agreements, which may be able to develop consensus, may not remain at the mercy of those agreements which do not have consensus. It would also show a step by step approach to achieve space security. Moreover, an agreement, having a single point agenda, would demonstrate a much more focused approach regarding a particular agenda item.
3. In order to address the lacunas in existing space legislation, if possible, new amendments or protocols, legislated in the light of new challenges, can also be introduced in those treaties. This will resolve the issue of negotiation and conclusion of new agreement to some extent.
4. There is no doubt that a comprehensive ASAT test ban is desirable. It may resolve the dominant issue of space security if negotiated, concluded, signed and implemented by the spacefaring states. One may anticipate the fate of comprehensive ASAT ban agreement similar to that of the Comprehensive Test Ban Treaty (CTBT). CTBT also prohibits all types of nuclear tests but has still not entered into force. So, some type of partial test ban despite deficiencies, may be a relatively low-hanging fruit for which efforts can be made by the states.

Conclusion

Weaponisation of outer space has emerged as one of the major challenges that the world is facing as it endangers the placement of peaceful space objects. Existing space laws, to ensure space security are eclipsed by their profound shortcomings of definitional clarities and non-incorporation of newly emerging space technologies and weapons systems. Whereas, proposed space security laws e.g. the PPWT in the CD are a victim of states' interests to a very large extent. However, they provide a good starting point in terms of reducing vulnerabilities of space assets.

In such a situation, conceptualisation of a peaceful outer space environment and finding out the indicators of space security is important as they constitute the spirit of the main goal to achieve outer space security. The formulation of adequate space security laws, by all space-faring nations, can improve the level of future space security, which has been increasingly threatened by rapid technological advancements in an environment lacking restraint and responsibility by the powerful states.

Different treaties can be separately negotiated to achieve those indicators rather than introducing a full-fledged space legislation ensuring comprehensive space security which may be difficult in terms of consensus building among all states. Moreover, protocols and amendments can also be negotiated to address the inadequacies of existing space security agreements.

Furthermore, considering the safety and security concerns, legislation for banning ASAT tests requires prioritisation. A comprehensive ASAT test ban can be determined as an ultimate goal that may be achieved through a step-by-step approach through partial ASAT test ban agreements.■