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SPACE FOR CHANGE: THE ASAT TESTS IN OUTER SPACE IN LIGHT OF THE UN LIABILITY CONVENTION

Abstract: As space exploration is gathering pace, special care must be attributed to preserving outer space as a shared environment that can be explored freely by humankind. Currently, there exists no comprehensive legal framework regulating the use of conventional weapons in outer space. This has been made evident by repeated tests of anti-satellite weapons (ASATs) which took place in the XXI century and produced massive amounts of debris, possibly interfering with the rights of other states to explore space freely. This article examines the rules provided by the UN Liability Convention and their application to ASAT tests in outer space. The author reviews academic suggestions in the field and concludes that a multilateral and comprehensive legal framework needs to be established in order to guarantee unrestrained exploration of space.

Keywords: ASAT; conventional weapons; liability convention; outer space.

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1. Introduction

From the very beginning of space exploration, humanity has stressed the desire to restrict it to peaceful purposes resulting in the benefit of all mankind.[1] Noble they may sound, these declarations are not immune to the political reality. Space pioneers and new state actors, benefitting from technological progress, seek to use the vastness of space to change the balance of power in their favour. While doing so, they tend to disregard the interests of other parties. The anti-satellite (ASAT) tests, where a small-capacity rocket is used to target and destroy a satellite in outer space, may serve as an example of an unregulated threat. Dangerous in nature, they produce massive amounts of debris floating around the planet and interfere with other states' rights regarding space exploration.

The need for legal framework regulating the use of outer space and celestial bodies was expressed even before the human species started to fly into space.[2] In this aspect, the journey of Sputnik I into outer space in 1957 marks the ground-breaking event which transformed academic suggestions regarding space law into political necessity.[3] Space law was shaped by the bipolar order of the Cold War from the very beginning. However, recognising its potential in the nuclear age, the superpowers agreed to mutually limit their capabilities in a series of pronouncements and legislative acts. In 1958, the General Assembly of the United Nations recognised the need for conventions concerning international co-operation in matters of outer space, establishing the common interest of mankind and reserving it for peaceful purposes only. In 1959, the Committee on the Peaceful Uses of Outer Space was established.[4] In 1961, another UN resolution highlighted the need to use outer space for the betterment of humankind only and recognised the rights of all states, independent of their level of development. The Declaration on Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space was issued in 1963.[5] The Outer Space Treaty, constituting the most extensive piece

[1] I. H. Ph. Diederiks-Verschoor & V. Kopal, *An Introduction to Space Law,* 3rd revised edition, Kluwer Law International 2008, p. 1-2.

[2] F. Lyall & P.B. Larsen, *Space law; a treatise*, Ashgate Publishing 2013, pp. 4-7.

[3] I.H.Ph. Diederiks-Verschoor & V. Kopal, op. cit., pp. 2-3.

[4] GA Resolution 1472 (XIV) of 12.12.1959.

[5] GA Resolution 1962 (XVIII) of 13.12.1963.

of legislation on the subject and being a starting point for further efforts, entered into force in 1967.

The above-described developments outlined the principles governing the use of outer space. However, in reality, they remain limited in their scope of application and prove inefficient when viewing recent events. For example, the delimitation of outer space is still unresolved.[6] The Outer Space Treaty does not prohibit employment of conventional weapons in outer space. Its nature also makes it difficult for the binding system of customary law of space to emerge. This is why we examine the Liability Convention in search of a remedy. The convention was adopted in 1971 in response to the growing need to provide for a liability regime concerning activities of states in space. It is now one of the five treaties governing the use of space. We will verify whether it can be applicable to the cases of anti-satellite tests. The question addressed in this paper is: what are the legal obligations of states with regard to the damage caused by their ASAT tests in outer space under the Liability Convention? In order to do this, we firstly define what ASATs are by looking at their technical properties and legal status. Secondly, we move to describe legal obligations of states concerning their use under the Liability Convention. We then mention academic suggestions on the subject concerning further development of law in the field.

2. ASATs defined

Anti-satellite (ASAT) systems are conventional weapons used to target, destroy or damage satellites. The technology could also be used for ballistic missile defence.[7] They have been tested in space by the United States and Russia since the 1960s.[8] They can be subdivided into two categories: direct ascent systems, using ballistic missiles to put an interceptor on trajectory and destroy the target with sheer kinetic force, and space-to-space co-

[6] I.H.Ph. Diederiks-Verschoor & V. Kopal, op.cit., pp. 15-22.

[7] U.S. Congress, Office of Technology Assessment, *Chapter 5: ASAT Arms Control: History* in: "Anti-satellite Weapons, Countermeasures and Arms Control: Summary", U.S Government Printing Office, Washington 1984, p. 94. Retrieved via: https://www.princeton.edu/~ota/disk2/1985/8502/850207.PDF. Last visited on 16.04.2015.

[8] B. Weeden, *Anti-Satellite Tests in Space – the Case of China*, Secure World Foundation 2013.

orbital systems, which require a space launch vehicle to place an interceptor in orbit, which then collides or passes by the target, using explosives to destroy the latter.[9] Another type of anti-satellite weapon, using "directed energy" in the form of a laser beam, sub-atomic particles, radio-frequencies or microwave generator, may also emerge to play an important role in the future.[10]

The past few years have seen China join the arms race.[11] It conducted a series of tests, allegedly aimed to demonstrate its rocket capabilities. In 2007, China tested its SC-19 direct ascent ASAT weapon by destroying its FY-1C weather satellite at an altitude of 865 kilometres. It constituted the first successful interception of a satellite since the United States destroyed its P78-1 satellite.[12] The Chinese test was the largest single debris-creating event in the history of space exploration, which produced 3,000 pieces of traceable debris and an estimated 150,000 pieces of unidentified particles, much of which will remain in space for years.[13] Travelling at high orbital velocities, pieces of debris created in this way passed dangerously close to the International Space Station, putting it on alert for a risk of collision. Despite international criticism, China continues to test its ASAT systems.[14] According to US intelligence, the PRC has continued to conduct ASAT tests throughout the 2010s.[15] Being the most recent contributor, China is by no means the only polluter: hundreds of large pieces of debris remain in space after Soviet and US tests in the 1970s/1980s.[16] The Chinese tests resulted

[9] K.D. Hebert, *Regulation of Space Weapons: Ensuring Stability and Continued Use of Outer Space*, "Astropolitics: the International Journal of Space Politics and Policy" 2014, vol. 12, no. 1, pp. 3-4.

[10] D.A. Koplow, *ASAT-isfaction: Customary International Law and the Regulation of Anti-satellite Weapons*, "Michigan Journal of International Law" 2009, vol. 30, no. 4, p. 1201.

[11] A.J. Tellis, *China's Military Space Strategy,* "Survival: Global Politics and Strategy" 2007, vol. 49, no. 3, pp. 41-72.

[12] P.C. Saunders & C.D. Lutes, *China's ASAT Test Motivations and Implications*, 'Joint Force Quaterly' 2007, vol. 46, 3rd quarter, pp. 39-45.

[13] N.L. Johnson et al., *History of On-orbit Satellite Fragmentations*, 14th edition, NASA: Orbital Debris Program Office 2008, p. 386.

[14] B.Weeden, *Through a Glass, Darkly: Chinese, American and Russian Anti-satellite Testing in Space*, Secure World Foundation 2014.

[15] D.R. Coats, *Worldwide Threat Assessment of the US Intelligence Community*, Statement for the record, US Senate, 13.2.2018. Retrieved via: https://www.intelligence.senate.gov/sites/default/files/documents/os-dcoats-021318.PDF.

[16] NASA, New Debris Seen from Decommissioned Satellite with Nuclear Power Source, 'Orbital Debris Quarterly News' 2009, vol. 13, no. 1, pp. 1-2; J.S. Imburgia, *Space*

in an immediate response from the United States, which launched its USA-193 reconnaissance satellite, possibly marking a new stage of the arms race in space.[17]

There are many ways in which the tests of anti-satellite weapons may cause damage to the persons or property of other states. The interceptor, in the form of a missile, could hit another state's stations or satellites. The damaged or destroyed target satellite of the launching state also possesses this capability, usually being beyond control. Creation of space debris is another important problem.[18] Its academic definitions point to man-made space objects and their component parts which are beyond control and face no foreseeable prospect of becoming controlled.[19] By creation of space debris, ASAT tests also contribute to the Kessler syndrome, a scenario in which the density of objects surrounding the Earth is high enough to produce a collision, each collision creating more debris and resulting in higher risks of further collisions.[20] The Earth's orbit is growing more and more cluttered at an increasing pace and may result in physical restrictions on humanity's use of space. This could also hamper the opportunities for developing a commercial sector in space, especially space tourism.[21] Therefore, the possibility of invoking state liability for the damage done by debris created as a result of ASAT tests forms an important part of our analysis.

Despite their apparent dangers, there is no existing legislation prohibiting testing of ASATs in outer space. Article IV of the Outer Space Treaty only covers placement of nuclear weapons in space under the scope of its prohibition. The destruction of FY-1C in 2007 only violated the obligation of China to engage in consultations under Article

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Debris and Its Threat to National Security: A Proposal for a Binding International Agreement to Clean Up the Junk, 'Vanderbilt Journal of Transnational Law' 2011, vol. 44, p. 604.

[17] V. Anantatmula, *U.S. Initiative to Place Weapons in Space: The Catalyst for a Space-Based Arms Race with China and Russia*, 'Astropolitics: The International Journal of Space Politics & Policy' 2013, vol. 11, no. 3, pp. 132-155.

[18] J. Su, *The environmental dimension of space arms control*, 'Space Policy' 2013, vol. 29, no. 1, pp. 58-66.

[19] Draft Convention on Space Debris adopted by the International Law Association in 1994.

[20] B.E. Bowen, *Cascading Crises: Orbital Debris and the Widening of Space Security*, 'Astropolitics: The International Journal of Space Politics & Policy' 2014, vol. 12, no. 1, pp. 47-50.

[21] A. Lele, *Security Connotations of Space Tourism*, 'Astropolitics: the International Journal of Space Politics and Policy' 2013, vol. 11, no. 3, pp. 218-230.

IX of the Outer Space Treaty.[22] However, even this conduct was in line with state practice during the Cold War. By its conventional nature, anti-satellite weapons also do not fall under the scope of non-proliferation treaties. The late ABM Treaty was limited in its application to ASAT weapons capable of intercepting ballistic missiles and was terminated with the withdrawal of the US in 2002. A series of bilateral negotiations between the US and the USSR addressing the issue was rendered impotent in the face of the complexity of the issue.[23] Therefore, there exists no suitable legislation addressing the problem, and international criticism usually does not extend to invoking the legality of tests under international public law.

3. Relevant obligations under the Liability Convention

In light of the unsuitability of other instruments in regulating the use of ASATs, we turn to the Liability Convention in search for a way to hold states liable for their actions. The Convention on International Liability for Damage Caused by Space Objects was established in 1972 via the United Nations in response to the growing need to regulate liability for the space activities of states.[24]

Article I of the Liability Convention states that "damage", in light of the Convention, means loss of life, personal injury or other impairment of the health of persons, as well as destruction or damage to property of other states or to natural or legal persons or the property of international organisations. The term "launching state" denotes the state which launches the object causing damage, or the state whose territory is used to do so. Article III of the Convention excludes damage done to nationals of the launching state or foreign nationals taking part in the launching operation from the scope of application of the Convention. Article IX provides that claims for compensation should be presented via diplomatic

[22] M. Mineiro, *FY-1C and USA-193 ASAT intercepts: an assessment of legal obligations under article IX of the Outer Space Treaty*, 'Journal of Space Law' 2008, vol. 34, no. 2, pp. 354-355.

[23] D.A. Koplow, op.cit., pp. 1215-1216.

[24] J. Oppenheim, *Danger at 700,000 Feet: Why the United States Needs to Develop a Kinetic Anti-Satellite Missile Technology Test-Ban Treaty*, 'Brooklyn Journal of International Law' 2012, vol. 38, no. 2, pp. 771-772.

channels. In case the states concerned do not maintain diplomatic relations, the claim can be transmitted through the Secretary-General of the United Nations. Article X of the Convention provides for a time limit of one year for registering a claim. This rule can be derogated from in cases when the victim state exercising due diligence discovered the liability of another state later; in this event, it would have another year to register the claim.

According to Article II of the Liability Convention, absolute liability is only invoked in cases of damage caused on the surface of earth or to aircraft in flight. In these cases, states will be liable under any circumstances, including cases of *force majeure*.[25] Article VI(1) of the Liability Convention provides for an exception from this rule if the launching state can prove that damage resulted wholly or partially from gross negligence or an intentional act or omission on the part of the claimant. However, Article VI(2) of the Convention states that no exoneration shall be granted whatsoever if the launching state acted contrary to its obligations under international law, particularly the Charter of the United Nations and space law treaties. Therefore, if space objects or their consistent parts employed in an ASAT test by the launching state fall and cause damage on the surface of earth or to aircraft in flight, absolute liability should be invoked under the conditions of Article VI.

A fault-based regime operates with regard to damage done to the property of other states in outer space under Article III. Therefore, the state suffering damage as a result of an ASAT test must prove the fault on the part of the launching state: the victim state must prove intentional or negligent conduct on the part of the launching state and negate the plea of contributory negligence on its own part.[26] This provision successfully limits the possibility of claiming liability from the launching state, as the latter may claim that the satellite constituting the target of the ASAT test was defunct and out of control and that it is up to other states to navigate their functional satellites to avoid collision. Article XII of the Liability Convention states that any compensation due by the launching state is to be determined in accordance with international law and in line with the principles of justice and equity. This provision must be read in line with the definition of "damage" provided in Article I(a). It also relates to the *Chorzow Factory* case by stating that the situation

[25] I.H.Ph. Diederiks-Verschoor & V. Kopal, op.cit., pp. 37-38.

[26] P. Chatterjee, *Legality of Anti-Satellites under the Space Law Regime*, 'Astropolitics: the International Journal of Space Politics and Policy' 2014, vol. 12, no. 1, p. 36.

must be restored to the setting which would exist had not the damage taken place.[27] This solution was adopted in order to avoid different states claiming jurisdiction over the mode of compensation.[28] Article XI(1) states that exhaustion of local remedies shall not be required for states to proceed under the Liability Convention. However, the second paragraph of this article excludes recourse to convention once action has already been taken in the domestic courts of the launching states.

The Liability Convention does not contain a definition of space debris. Article I(d) of the Convention states that the term ''space object'' encompasses its component part, launch vehicle and its parts. In case of ASAT tests, the issue mainly concerns parts of the destroyed/damaged satellite, the missile and any further devices used to set the interceptor on its target and remain in space. The Liability Convention does not cover the damage done to the space environment, and it remains unclear whether it could apply to fragmentation debris or micro-particulate matter.[29] The fault-based regime under Article III makes it easier for the states to escape liability, as it remains difficult for the claimants to prove the connection between their activities and the damage done by the space debris. Finally, there exists no universally accepted mechanism for tracking and identifying debris created as a result of state activities.

Therefore, it can be seen that the Liability Convention provides for a restrictive fault-based approach to state liability for its activities in outer space. The Convention is also not free of lacunas: the extent of its application to space debris remains unclear, and in a theoretical scenario where an ASAT weapon hits the property of another state in outer space and together they cause damage to the persons or objects of a third state, Article IV provides that both launching states should be jointly and severally liable, possibly resulting in unfair results.[30] It must also be mentioned that most of the claims so far have been settled extra-judicially by means of state-to-state negotiations.[31]

[27] Chorzów Factory Case (Germany v. Poland) PCIJ, Series A, No. 17, 1928, p. 29.
[28] P. Chatterjee, op. cit., p. 37.
[29] Ibid, pp. 39-40.
[30] P. Chatterjee, op.cit, p. 37.
[31] I.H.Ph. Diederiks-Verschoor & V. Kopal, op.cit., p. 42.

4. Proposals for reforms

In light of the visible need for legal reform, multiple ideas have been put forward by academics. These concern both ex ante and ex post ways to curb the risks connected with the testing of ASATs. This sentiment is also shared by professionals: a survey of 105 participants employed in the space sector in the US shown that 83.7% feel that there exists a need for legal reform addressing the issue.[32]

ASAT tests are a symptom of a larger problem: the lack of regulation of the use of conventional weapons in outer space. One of the ways of addressing this issue was the initiative of establishing a Prevention of Arms Race in Outer Space Agreement (PAROS), which has been discussed for over 30 years through the Conference on Disarmament and has resulted in two draft treaties proposed by a joint initiative of China and Russia.[33] However, meaningful discussions related to the militarisation of space are yet to gain traction, and legally binding solutions have not materialised.[34] In order for this to happen, a multilateral format of negotiations is needed, and this must be fuelled by the recognition of common interest in the preservation of space as a shared environment.

Some academics argue that ASAT tests in outer space should be totally prohibited. For example, Koplow argues that customary international law should be extended to ban the use of ASATs in space.[35] The other way to achieve this objective would be to develop a test-ban treaty directly addressing the issue.[36] Other suggestions include amending the treaties by extending the obligations concerning state liability beyond the scope of customary international law.[37] The Liability Convention should provide for an absolute liability regime for the damage done by tests of ASATs in outer space.[38] In cases of ambiguity regarding their obligations, states should also make more frequent use of peaceful settlement of disputes

[32] K.D. Hebert, op.cit., pp. 17-18.

[33] 2008 & 2014 Updated Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects.

[34] Ibid.

[35] D.A. Koplow, op.cit.

[36] J. Oppenheim, op.cit.

[37] S. Trepczynski, *The Effect of the Liability Convention on National Space Legislation*, 'Journal of Space Law' 2007, vol. 33, pp. 242-243.

[38] P. Chatterjee, op.cit., pp. 40-41.

provisions under the UN Charter.[39] Considering the fact that the nationals of the launching state cannot invoke the Liability Convention, setting up an International Compensation Fund to aid individual victims has been proposed.[40]

For now, there exists no proven way of removing debris from space, and the issue remains widely debated in academic circles.[41] The technological development of anti-satellite weapons themselves may also serve to minimise the threat of creating new debris. For example, using a laser beam instead of a missile to target a satellite would leave the latter dysfunctional without creating additional pieces of debris.[42] However, this hypothetical development cannot remedy the harmful effects of existing and accumulating space debris. States must recognise the urgency of the problem and, benefitting from technological progress, take action before space exploration becomes unmanageable. One of the proposals concerns extending the scope of the Liability Convention to explicitly cover space debris created as a result of ASAT tests and to provide for the liability of states concerning the environmental damage done by their activities. However, this solution would need a universally accepted tracking mechanism to function and guarantee its enforcement.

Therefore, any move to regulate the testing of ASATs in outer space is dependent upon the initiative of the states concerned. The latter must recognise that it is in their best interest to do so, particularly if they wish to continue their space programmes. One recent example of a development in the desired direction is the formulation employed in Article 4.2 of the *Draft Code of Conduct for Outer Space Activities* proposed by the European Union, which states that the subscribing states should refrain from any form of activity which brings, either directly or indirectly, damage or destruction of space objects unless justified by safety considerations, a UN Charter or reduction of space debris.[43] Even in cases where such action is justified, states should seek to minimise the creation of space debris. If the Code was adopted and ratified by like-minded states, it would constitute a stepping

[39] M. Mineiro, op.cit., pp. 355-356 & UN Charter Articles 33-38.

[40] H. Ph. Diederiks-Verschoor & V. Kopal, op.cit., pp. 42-43.

[41] K.D. Hebert, op.cit., p. 13.

[42] D.A. Koplow, op.cit., p. 120.

[43] DRAFT International Code of Conduct for Outer Space Activities (Version 16.9.2013).

stone in preventing the harmful effects of the anti-satellite testing in outer space and in invoking further consequences for the states concerned.[44]

5. Conclusion

The rebirth of interest in ASAT weapons and their subsequent testing in outer space marks a new chapter of the arms race in outer space. By its destructive nature, this practice carries numerous risks to the space activities of other states and to space exploration in general. The tests of ASATs in outer space are not properly regulated under existing legal framework. By looking at the Liability Convention, we have discovered ways in which states may be liable for their anti-satellite tests in outer space. While Article II of the Convention provides for absolute liability in cases of damage done on the surface of earth or to aircraft in flight, it only operates under a restrictive fault-based regime with regard to damage done to persons or property of other states in outer space under Article III. The amount of compensation must be determined as to restore the victim to the situation that would have existed if the damage had not taken place. The Liability Convention remains vague in relation to the scope of its application to space debris and does not apply to purely environmental damage. Multiple suggestions have been put forward by academics, ranging from banning ASAT tests in outer space to regulating their use under international law. It is certain that relevant steps must be taken, be that through legal or diplomatic channels, in order to come to terms with the dangers of militarisation of space. Unless states take action, the whole enterprise of space exploration is at risk.

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[44] P. Chatterjee, 2014, op.cit., p. 42.

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