



Open-ended working group on reducing space threats through norms, rules and principles of responsible behaviours

Geneva, 30 January – 3 February 2023

Item 6(c) of the agenda

Consideration of issues contained in paragraph 5 of General Assembly resolution A/RES/76/231**To make recommendations on possible norms, rules and principles of responsible behaviours relating to threats by States to space systems, including, as appropriate, how they would contribute to the negotiation of legally binding instruments, including on the prevention of an arms race in outer space****“Non-Kinetic Anti-Satellite Weapons (ASATs)”- Submission to the third substantive session of the UN Open-Ended Working Group on “Reducing Space Threats through norms, rules and principles of responsible behaviours”****Submitted by the Outer Space Institute Working Group on Space Security**

1. In considering potential threats to safe operations in outer space, the chief focus has been on kinetic or destructive ASATs. This is understandable given the debris-creating nature of such weapons, which can aggravate the already serious problem of long-lived debris in orbit, with the severity dependent in part on the altitude at which the collision occurs. The Outer Space Institute (OSI) through its 2021 Open Letter espousing a testing ban on such ASATs has been an advocate of this restraint measure. It remains the hope of many stakeholders that a multilateral ban on the testing of kinetic ASATs could be an eventual “deliverable” from the OEWG process.

2. Although priority attention should be given to advancing the goal of a testing ban for kinetic ASATs, the issue of non-kinetic ASATs should not be ignored. These cover a range of systems which possess the capacity to disrupt, degrade or destroy the normal functioning of a space object. These effects can be achieved through the application of several physical phenomena, including directed energy (e.g., lasers and electromagnetic pulses), radio frequency spectrum interference (e.g., jamming and spoofing), cyber operations directed at space objects or their terrestrial infrastructure and non-kinetic capture or manipulation via another space object.

3. Arguably, non-kinetic ASATs may be more likely to be employed due to their diversity, availability to a wider range of actors, and potential challenges of attribution. This combination of factors raises the risks of misunderstandings and a corresponding prospect of escalation especially during crises. Stakeholders therefore need to begin addressing non-kinetic ASATs now, to reduce future risks.



4. It is important to flag that the threat from non-kinetic ASATs is not a theoretical one.¹ There have been over recent years several documented reports of their employment as well as their development and testing. Intermittent and in some cases persistent jamming or spoofing of position, navigation, and timing (PNT) signals is regularly observed. There are also efforts to jam the signals from commercial telecommunications satellites to prevent broadcasting in certain parts of the world. More worryingly, there has been at least one major and at least partially successful cyberattack against a satellite network.

5. Rendezvous and proximity operations (RPO) are also increasing in frequency. While these do not necessarily violate the obligation of due regard, several states have undertaken close approaches of their own satellites as well as satellites operated by foreign governments and commercial entities in both LEO and GEO orbital regimes. These activities may have a range of purposes including the testing of on-orbit servicing capabilities, surveillance of space objects and the surrounding environment, interception of signals transmissions, and, potentially, active interference. Regardless of their intentions, uncoordinated close approaches present challenges to other spacefaring actors. Uncertainty and ambiguity increase the risks of misperception, miscalculation, and accidents with spacecraft operating in relatively close proximity.

6. A foundational principle of international law holds that states may not interfere with the assets of another state, including in areas beyond national jurisdiction.² Therefore, outside of situations of armed conflict, actions taken by one state to disrupt, disable or destroy another state's satellite through physical strikes or any other means are already illegal under international law. In addition, the use of non-kinetic ASATs can be viewed as representing "harmful interference" as set out in Article IX of the *Outer Space Treaty*, within the context of the obligations of "due regard" and consultation. Harmful interference with the radio transmissions of a satellite is a violation of Article 45 of the International Telecommunication Union (ITU) Constitution. Depending on the nature of the satellite targeted by non-kinetic ASATs, even a temporary loss of functionality could be dangerous (e.g. for early-warning systems operated by nuclear weapon states). The International Committee of the Red Cross has noted that "...technology enabled by space systems permeates most aspects of civilian life, making the potential consequences of military space operations a matter of humanitarian concern." The ICRC continued by stating "It is clear that the disruption or destruction of space systems serving critical infrastructure that enables the delivery of essential civilian services could have wide-reaching consequences for the civilian population, including humanitarian organizations". These consequences would ensue regardless of whether the operations were kinetic or non-kinetic in nature. By way of a conclusion the ICRC suggested that "In particular, in light of the risks of significant civilian harm, States may decide to set additional general prohibitions or specific limits with regard to weapons, hostilities or other military operations in relation to outer space...".³

7. Potentially-agreed restraints on the use of non-kinetic ASATs could take several forms, ranging from restrictions on testing against one's own satellites to agreed parameters for the use of non-kinetic ASATs both in peacetime and during an armed conflict. A voluntary approach to limitations on testing or use might be suitable, perhaps akin to that adopted by UN member states with respect to the use of information and communication technologies (ICT) in the context of international security. A 2015 Group of Governmental Experts (GGE) report, subsequently endorsed by a consensus UNGA resolution, enumerated eleven voluntary norms of responsible state behaviour in cyberspace.⁴ This framework is intended to promote international cooperation and the goal of a "peaceful ICT environment". Among the agreed norms was the non-targeting by cyber means of critical infrastructure on

¹ A civil society analysis recently concluded that "only non-destructive capabilities are actively being used in current military operations." Brian Weeden and Victoria Samson, "Global Counterspace Capabilities: An Open Source Assessment" (Washington, DC: Secure World Foundation, April 2022), xii, https://swfound.org/media/207350/swf_global_counterspace_capabilities_2022_rev2.pdf.

² This excludes certain exceptional circumstances, such as countermeasures and the right of self-defence.

³ ICRC statement to OEWG on Reducing Space Threats, Geneva, September 13, 2022.

⁴ Report of the Group of Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security, UNGA A/70/174, 22 July 2015.

which the public depends.⁵ A similar non-targeting norm could be applied to non-kinetic ASATs.

8. Adherence to guidelines chiefly depends on the willingness of states to follow them. This willingness could well be enhanced through developments in space situational awareness (SSA), including commercial and civil society capabilities, as well as a greater commitment to open data regarding satellite activities and anomalies. Non-kinetic forms of interference are undoubtedly harder to discern than major kinetic events like the destruction of a satellite. Yet the rapidly expanding range, location, and sensitivity of sensors, combined with improvements in computer processing power and machine learning are transforming the ability to monitor activities across orbital regimes.⁶ These capabilities have been demonstrated on numerous occasions in recent years. The OEWG could consider what types of existing or anticipated SSA capabilities might be brought to bear in addressing non-kinetic ASATs. Effective monitoring will necessitate enhanced data-sharing among governments, intergovernmental bodies, commercial operators, and civil society. This involves both increasing transparency of SSA data and more timely and extensive reporting under the UN Registration Convention.⁷

9. From the perspective of reducing space threats there is an essential inter-relationship between kinetic and non-kinetic ASATs and possible restrictions on them. Progress in limiting testing has been achieved with respect to kinetic ASATs. Concerns have been raised that constraints on kinetic ASATs should not leave outer space operations vulnerable to non-kinetic ASATs. Similarly, addressing only restrictions on kinetic ASATs could be viewed as favouring states possessing non-kinetic ASAT capabilities. In order to have a more comprehensive and equitable approach to restraint measures on ASATs, it would seem necessary over time to cover both kinetic and non-kinetic systems.

10. In conclusion, we believe it would be appropriate as the OEWG continues its work to ensure that non-kinetic ASATs are not overlooked.

11. The following members of OSI's Space Security Working Group contributed to this submission: Paul Meyer, Adam Bower, Aaron Boley, Michael Byers, and Jessica West.

⁵ 3(f) "A State should not conduct or knowingly support ICT activity contrary to its obligations under international law that intentionally damages critical infrastructure or otherwise impairs the use and operation of critical infrastructure to provide services to the public;" Report of the Group of Governmental Experts on Developments in the Field of Information and Telecommunications in the context of International Security, A/70/174 22 July 2015.

⁶ Daniel Porras, "Eyes on the Sky: Rethinking Verification in Space," Space Dossier (Geneva: United Nations Institute for Disarmament Research, October 2019), <https://unidir.org/publication/eyes-sky>.

⁷ Ram S. Jakhu, Bhupendra Jasani, and Jonathan McDowell, "Critical Issues Related to Registration of Space Objects and Transparency of Space Activities," *Acta Astronautica* 143 (2018): 406–20.