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The final frontier: Prospects for arms control in outer space

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The final frontier: Prospects for arms control in outer space

Sergio Marchisio¹

The evolution of space operations: change and dynamics

Space operations have profoundly changed since the adoption of the first legally binding international instrument, the Treaty on Principles governing the activities of States in outer space, the moon and celestial bodies (OST), in 1967. Space activities have rapidly evolved with the growing participation of actors in the space economy. New spacefaring nations have emerged, along with private actors and innovative organisations focused on new technologies in space. Commercially driven projects, such as the small satellite mega-constellations initiative, facilitating access to space at reduced cost and accelerated production, have made tangible contributions to the daily lives of millions. Used for the benefit of humankind, they help us to understand better the consequences of disasters, environmental challenges, climate change and natural resource management.

Two essential steps are needed for humanity to benefit from all space has to offer: increased access to space technologies, and a promotion of international cooperation. Achieving both would enable the international community to make space a driver for equality and help attain the United Nations Sustainable Development Goals (SDGs). There are, however, also growing concerns relating to challenges posed. Current changes in the development of outer space exploration and use are leading to congestion,

orbital debris generation, an increased risk of collision, and miscalculation amongst States, and the line between civil and military objects and technologies in space is blurring. There are growing ranges of activities in outer space that are potentially hostile to other space activity, or are “grey zones” around the thresholds of armed conflict. The handling of space debris, the possible effects of large constellation deployments on the orbital debris environment, possible risks imposed on space missions by new applications, and emerging threats to the security and resiliency of orbital infrastructures all require attention.

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The pursuit and use of anti-satellite (ASAT) capabilities is of concern. In April 2019, an Indian ASAT test increased the number of States in possess of such capability to four. Significantly, the use or testing of ASATs may create long-lasting clouds of debris, impairing the security of outer space activities. The integration of military capabilities on commercial satellites is further blurring the lines between peaceful use and hostile action. A growing reference toward ‘intent’ greatly explains the difficulties in detecting and explaining why an object is in space and carrying out proximity operations. A key challenge, therefore, is the difficulty in verifying the nature, characteristics, and intended function of an outer space object once placed in orbit. What is currently lacking is a proportional approach to commitments on harmful or hostile acts against outer space objects that take into account the nature of

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each threat, the challenges associated with attribution and verification, and the dual-use application (civil and military) of objects and capabilities.

The dangers posed by space operations to international security

If one is to assess current security challenges relating to outer space, the main assumption is that a growing number of factors threaten the environment: civil, commercial, and military operations all depend on space being free from interference. Specifically, concerns relate to the growing diversification of actors and their activities, including policies that consider outer space to be a war-fighting domain - such as research and development of space-to-space, ground-to-space and space-to-ground capabilities, and the possible placement of weapons in space and/or use of force against space objects and their ground-based infrastructure. The area of space operation has become increasingly relevant: long-term sustainability and space traffic management, as well as responsible behaviour in outer space to face the challenges posed by the potential use of applications and technologies for harmful actions are significant topics. There are systems that have legitimate, beneficial uses (such as on-orbit servicing and active debris removal systems), that are also inherently capable of being used to interfere with other operators' space systems, as technologies are dual use by nature. Space hybrid operations span an ever-increasing number of areas, including the commercial, adding a further layer of complexity to risk and threat assessments, and areas of potential regulation. Space objects and technologies that are not necessarily arms can be used for aggressive purposes, where again one must assess "intent". Threats more closely linked to potentially hostile behaviours include the use of electronic warfare to overwhelm satellites and affect functioning, or use of laser beams to damage optical sensors.

While threat perceptions vary considerably, there are at least three scenarios requiring attention: space-to-space; space-to-ground; and ground-to-space hostile actions, as well as attacks against terrestrial infrastructure related to space objects.

Threats can be organised on a continuum from low-intensity (reversible and disruptive impacts) to high-intensity (irreversible and destructive impacts). Including (i) electronic warfare, jamming and spoofing; (ii) cyber-attacks; (iii) directed energy attacks; (iv) orbital-based anti-satellite systems; (v) ground-based anti-satellite weapons; and (vi) nuclear detonations. In this context, spacefaring nations and non-state actors engaged in the exploration and use of outer space, *per se* a positive evolution, could convert in a negative element for the safety, predictability and security of outer space activities. Threats impose the need to sustain and protect critical public and private space infrastructure, meaning that space security has become a globally shared concern. Space security requires urgent collective action and international solutions for balancing differing priorities including, but not limited to, sensitive national security interests, equitable access to the space domain for emerging States, and protection of the space environment. Some issues are considered particularly urgent, such as the aforementioned prevention of development and testing of ASAT capabilities, including those that are terrestrially based.

Complexity of the topic concerning space security in outer space

Issues relating to sustainability, safety and security of outer space activities are highly complex. They are complementary, but involve technical as well as sensitive political aspects. The use of outer space in a manner that maintains its potential to meet the needs and aspirations of present and future generations, ensuring humanity

continues to use outer space and celestial bodies for peaceful purposes, scientific and technological advancements and socioeconomic benefits means *sustainability*. The term *safety* refers to a regime in which risks connected to ultra-hazardous space operations can be identified, assessed, managed consistently, and in which the public risk is as low as is feasibly possible. *Security* of outer space refers mainly to freedom from threat and action that would ultimately undermine the continued use of outer space for countries for legitimate purposes. For example, any intentional and harmful interference with space systems, including supporting infrastructures, would constitute an infringement of outer space security.

The development of competing military capabilities and the acceleration of spending in the quantitative and/or qualitative development of weapons is of concern. Military use of outer space, in accordance with international law (including the 1967 Outer Space Treaty (OST)), is not prohibited. Furthermore, existing international legal frameworks do not prevent activities that may have the potential to lead to an arms race in outer space. The 1967 OST contains an obligation to States Parties not to place in orbit around Earth any objects that carry nuclear weapons, or any other weapons of mass destruction, install such weapons on celestial bodies, or station them in outer space in any other manner. The placement of conventional weapons in orbit, however, is not mentioned. By contrast, the Treaty marks the use of the moon and other celestial bodies *exclusively* for peaceful purposes; forbidding the establishment of military bases, installations and fortifications, weapons tests of any kind, and the conduct of military manoeuvres on celestial bodies. This means that the Treaty establishes a regime of complete demilitarisation *only* for the moon and other celestial bodies.

The complexity of issues relating to the security of outer space operations, and the

prevention of outer space becoming an area of conflict, is evidenced by the difficulties encountered at the multilateral level in the adoption of international instruments, either legally or non-legally binding, on responsible behaviour and arms control in outer space over the last two decades. To date, a first successful initiative has been the landmark consensus reached in 2013 by the United Nations Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space (TCBMs), adopting a report that contained recommendations on voluntary measures for responsible behaviours in outer space.² The Group recommended that States and international organisations consider and implement a range of measures to enhance the transparency of outer space activities, further international cooperation, consultations and outreach, and promote international coordination in order to enhance safety and predictability in the use of outer space.

The Committee on the peaceful uses of outer space of the United Nations (COPUOS), in ten-year long project under the Working Group on the Long-term sustainability of outer space activities (WG-LTS), was unable to adopt a decision regarding its final report and submit to the General Assembly for endorsement at the end of its mandate in 2018.³ However, in June this year, COPUOS reached a positive step in adopting the preamble and 21 guidelines previously agreed within the WG. Alongside establishing a five-year working group under the agenda item on long-term sustainability of its Scientific and Technical Subcommittee

² United Nations General Assembly, Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities, A/68/189 (29 July 2013). <<https://undocs.org/A/68/189>> [accessed 1 July 2019]

³ United Nations Office for Outer Space Affairs, Guidelines for the Long-term Sustainability of Outer Space Activities, A/AC.105/2018/CRP (28 June 2018). <http://www.unoosa.org/res/oosadoc/data/documents/2018/aac_1052018crp/aac_1052018crp_20_0_html/AC105_2018_CRP20E.pdf> [accessed 1 July 2019]

for continued institutionalised dialogue on issues relating to the implementation and review of guidelines.

In 2008, the European Union, under the framework of Common Foreign and Security Policy (CFSP) also attempted efforts to secure political commitments to encourage responsible action in, and peaceful use of, outer space. Efforts to develop an International Code of Conduct for Outer Space Activities (ICoC), formally presented in 2012, through open-ended consultations and multilateral consultations with interested countries did not secure any outcome due to a series of oppositional vetoes. This was despite the ICoC being supported by several states,⁴ and providing the added benefit of simultaneously addressing civil, commercial and military operations in space. An initiative tabled by Russia and China in 2008 with the Conference on disarmament concerning the draft treaty on the prohibition of the placement of weapons in outer space (PPWT) has until now not reached the phase of a truly international negotiation. Similarly, the process activated by the United Nations General Assembly Resolution 72/250 on “Further practical measures for the prevention of an arms race in outer space (PAROS)”, adopted in December 2017, ended without the Group having been able to adopt a consensual report in April 2019.⁵

Perseverance despite difficulties: politically feasible recommendations

More than ever, a set of international

⁴ European External Action Service, International Code of Conduct for Outer Space Activities - Version 31 March 2014, Draft with annotation. (May 2015) <https://papersmart.unmeetings.org/media2/7650867/annex_draft-code-of-conduct_may-2015.pdf> [accessed 1 July 2019]

⁵ United Nations General Assembly, Group of Governmental Experts on further practical measures for the prevention of an arms race in outer space, A/74/77 (9 April 2019) < <https://undocs.org/A/74/77>>

norms addressing the security of outer space activities is needed. While the adoption of legally binding norms revising or complementing the existing international legal regime would be difficult and time consuming, a non-legally binding instrument on basic principles and voluntary TCBMs has the potential to be a near-term outcome and important means to encouraging trust and confidence among space actors. That is to say, a positive first-step toward more engaging commitments for arms control in outer space.

“More than ever, a set of international norms addressing the security of outer space activities is needed.”

It is imperative to create a platform for exchanging views on the establishment of general principles of responsible behaviour, transparency and confidence building measures and make workable recommendations. These should address challenges associated with the dual-use applications, civil and military, of outer space objects and capabilities, but should avoid hindering access to such technologies for peaceful purposes. In this regard, regional organisations have an important role to play. The implementation of the already adopted, and practically oriented, recommendations of the 2013 Group of Governmental Experts (GGE) report on TCBMs should be ensured. These should be integrated, as needed, as a consequence of evolution in space operations. It remains necessary to continue developing and promoting a range of norms of behaviour not only to minimise orbital debris, but also to promote coordination of space operations, and to enable greater space situational awareness data sharing through international co-operation.

Codes of conduct are normative instruments used in the diplomatic practice in a variety

of fields: they have characteristics making them different from other categories of soft law. They embody political commitments that endorse basic principles of responsible behaviours in outer space and are open for further integration at a more technical level through best practices, standards and guidelines. It is legitimate to express compelling views, both for and against, a non-legally binding instrument having the peculiar features of a code of conduct. There is a value in agreeing such an instrument, potentially negotiated within the framework of the UN, which could compliment on-going initiatives in UN mandated bodies and take care not to duplicate efforts. This would allow for the delivery of key principles, such as common interest in progress of exploration and use of outer space for peaceful purposes, or the commitment to refrain from any action that brings about damage or destruction of space objects, creating long-lasting space debris, amongst others.

Crucially, there is a need to foster increased international cooperation in order to establish a set of politically backed principles and measures that prevent outer space from becoming an arena of conflict. This requires a renewed European engagement at the multilateral level, learning lessons from past experiences. There are two parallel paths for the EU to pursue, one to support the continuous discussion of guidelines, space norms, and regulations at the United Nations within the context of the COPUOS, and another to promote an autonomous initiative aimed at setting out a multilateral framework that could function as a platform for broader, global, agreements.



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