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Transparency and Confidence Building Measures for Outer Space Activities

Peter Martinez

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About Secure World Foundation

The Secure World Foundation strives to be a trusted and objective source of leadership and information on space security, sustainability, and the use of space for the benefit of Earth. We use a global and pragmatic lens to study and evaluate proposed solutions to improve the governance of outer space. While recognizing the complexities of the international political environment, SWF works to encourage and build relationships with all willing stakeholders in space activities, including government, commercial, military, civil society, and academic actors. Central to this approach is increasing knowledge about the space environment and the need to maintain its stability, promoting international cooperation and dialogue, and helping all space actors realize the benefits that space technologies and capabilities can provide.

About Dr. Peter Martinez

Peter Martinez is the Executive Director of the Secure World Foundation. He has extensive experience in multilateral space diplomacy, space policy formulation, and space regulation, as well as capacity building in space science, technology, and workforce development. Before joining the Secure World Foundation, he chaired the UN COPUOS Working Group on the Long-Term Sustainability of Outer Space Activities and the South African Council for Space Affairs.

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1. Introduction

Space systems are now part of the critical infrastructure of many countries. The growing demand for space-based information and services, coupled with the lowering of the technological and cost entry barriers for space activities over the past twenty years, has led to a sharp increase in the number and diversity of space actors. Consequently, the Earth's orbital environment is becoming congested with active satellites, contaminated by space debris, and contested by rival State and non-State actors alike. At the same time, space systems have become a critical component of the national military and security capabilities of many countries, even those countries that are not themselves major space actors, but rely on access to the space systems developed by other countries. Space systems constitute a critical component of the command-and-control structure of nuclear-armed States and are therefore vital for strategic stability. The growing reliance on space for defence and security creates a new set of vulnerabilities as more States jostle for advantage in the new 'high ground' of space. A growing number of States are developing, or have already developed, a range of counterspace capabilities that could be used to disrupt, degrade, deceive, or destroy access to various aspects of space capabilities.

Counterspace capabilities can take kinetic as well as non-kinetic forms. Kinetic threats include direct-ascent anti-satellite missiles launched from the Earth, or co-orbital weapons that engage a target satellite in space. Non-kinetic threats include directed energy (e.g. lasers), electromagnetic interference (e.g. jamming, spoofing), or cyber attacks. Counterspace threats can also be, at least in principle, deployed along several threat vectors to attack the ground segment or space segment of a space system (e.g. ground-to-space, space-to-space, space-to-ground, and ground-to-ground). But just because a certain kind of counterspace capability and threat vector is *imaginable*, does not mean that it is *practicable*. Nonetheless, the very fact that such possibilities are openly discussed and research programs are funded is enough to give them a prominence way beyond their actual technical feasibility, economic viability, or military utility.

This broad spread of potential counterspace capabilities and threat vectors has led to much speculation and mistrust among geopolitical rival States about each other's capabilities and intentions in space, giving rise to a situation which is rife with possibilities for misperceptions and miscalculations. Threat perceptions can

be very subjective, especially in a climate of mistrust where little information is openly exchanged. States take doctrinal, operational and institutional measures to mitigate perceived threats, and this gives rise to the classic security dilemma, in which actions taken by one State to increase its own security are perceived by other States as aggressive or threatening, which provokes a response to address perceived threats, thus producing a vicious spiral of unintended and undesired consequences that can undermine political and strategic stability in the space domain.

One such consequence of mistrust is that countries might consider placing weapons in outer space pre-emptively and that this would ultimately lead to an arms race in outer space. Since the early 1980's, the United Nations General Assembly has voted annually on a resolution on the Prevention of an Arms Race in Outer Space (PAROS). There have been attempts to develop a legally binding instrument to prevent the placement of weapons in space, but these initiatives have floundered because of disagreements among States as to whether such an instrument might even be verifiable given that there is as yet no agreement on what constitutes a space weapon.

The inherent dual-use character of space technologies makes the security dilemma more acute in space as it is difficult to distinguish between purely civilian space capabilities and the clandestine development and/or deployment of offensive military space capabilities. Hence, the development of technical capabilities with potential counterspace applications by one State may provoke a sense of insecurity in other States. This makes it difficult to make meaningful progress on space arms control instruments that focus on regulating technologies and/or capabilities because of the rapid pace of developments and the lack of agreement on what constitutes a space weapon.

Because of the difficulties outlined above, the traditional disarmament approach of seeking to prohibit certain technologies or capabilities is not practicable in the context of outer space activities. An important step forward in addressing this challenge is to move away from the notion of trying to identify and ban certain technologies to the approach of identifying norms for safe, responsible and non-aggressive behaviours in outer space.

Moreover, given the current evolution of the space arena, where commercial actors and commercial space activities are starting to dominate the space ecosystem, one must ask whether the prevention of an arms race in outer space should continue to be the main focus of space security discussions when observed on-orbit behaviours are raising concerns about the safety and security of space operations. While the technological capabilities of space objects are very difficult to discern at a distance, and unannounced intentions can only be surmised, behaviours in space can be observed by many actors. The way in which those behaviours are perceived by others depends on the transparency of the actors carrying out those behaviours.

In this regard, voluntary Transparency and Confidence-Building Measures (TCBMs) have an important role to play in clarifying the intentions of space actors and reducing the risk of misperceptions and erroneous assessments of the activities of States in outer space, thus helping to foster regional and global stability.

2. Characteristics of TCBMs

There are two categories of TCBMs: those dealing with capabilities and those dealing with behaviours. Both types of TCBMs help to increase transparency, familiarity and clarity of intentions and provide a basis for strengthening mutual trust and building confidence amongst States. Both types of TCBMs share the following characteristics:
Firstly, a good TCBM should be clear, practical, and proven, meaning that both the application and the efficacy of the proposed TCBM has been demonstrated by one or more actors. Secondly, the application of the proposed TCBM should be objectively verifiable by other parties, either independently or collectively. Thirdly, the proposed TCBM should reduce or even eliminate the causes of mistrust, misunderstanding and miscalculation with regard to the activities and intentions of the States and/or actors conducting those activities. With regard to this latter point, given their non-binding nature, TCBMs complement, but do not substitute for, the verification measures of legally binding agreements and regimes. TCBMs can, however, help to build trust and confidence to negotiate legally binding instruments.

TCBMs can be developed and implemented unilaterally, bilaterally or multilaterally. Evidently, TCBMs developed or socialized within a multilateral framework would have the best chance of adoption by the

broadest cross-section of the international community. Developing TCBMs outside of the multilateral system raises the risk of a proliferation of TCBM efforts, which could dilute their value. To avoid duplication and confusion in the development and implementation of multilateral TCBMs it is important to maintain coordination among all international institutions dealing with the same issues.

In developing TCBMs for outer space, it is particularly important to be able to demonstrate the practicability and utility of a particular measure or set of actions to the various actors involved within the scope of the proposed measure or actions. Hence, a proposed measure should be clear, implementable, proven (in terms of its application and effect), and verifiable. These attributes are key to its likely acceptance by the wider community, and its potential success as a TCBM.

3. Identifying TCBMs that are fit for purpose

To be effective, TCBMs should be adopted and implemented as widely as possible. However, implementation of TCBMs requires an investment of resources on the part of a State implementing a given measure and on the part of other States observing it. It is therefore important to demonstrate that the proposed measures or actions are applicable to the domain and the actors, that they are implementable, and that implementation is verifiable by other parties. In 2013, a group of international experts was mandated by the Secretary-General of the United Nations to study and make recommendations on TCBMs for space activities. This group of experts from 15 countries produced a consensus report that provided a framework for identifying and implementing space TCBMs that would be fit for purpose. The experts recommended considering implementation from the following perspectives: *What* exactly is the actual measure/action to be performed (or not performed)? *Why* is this beneficial – i.e. what is the rationale? *Who* will implement the measure? *When* is the measure to be performed?

What

It is necessary to articulate the actual measure or action that is to be performed. The description of the action required should not necessarily be prescriptive regarding the form of implementation, but it should indicate what ultimate objective or outcome is desired. What is the measure that should be implemented? Is it clearly identified and understood? What should be demonstrated to confirm implementation?

Why

Clearly, in order to justify a particular measure, it is important to demonstrate the value or benefit of performing an action. Accordingly, it is important to provide an explanation of why it is necessary to perform the action, that is, the rationale. What is the value or benefit of performing the measure? Do all relevant actors have a clear understanding of why it is important to be able to confirm or demonstrate implementation?

Who

It is important to identify the respective roles of the different actors. These range from those responsible for performing the required task to those responsible for monitoring and reporting. Who should implement the measure? Who will be able to confirm that the measure has been implemented?

When

When should the measure or action be implemented? Is it to be performed on fixed timescale (e.g., annually) or relative to a certain point in a project life cycle (e.g., in the post-operations phase)? At what point is demonstration or confirmation performed?

Given the wide spread of space capabilities of different countries, one must allow some flexibility in the implementation of TCBMs, as implementation will be consistent with national capabilities, needs, and state of development. For this reason, it is important to determine what TCBM implementation means in different contexts. This is why voluntary sharing of information on implementation experiences is very helpful. An example of such information sharing is the way that a growing number of States are starting to report their implementation experiences for the UN space sustainability guidelines, some of which are TCBMs. This kind of information sharing of implementation experiences and practices helps other States to consider how they might implement a given TCBM and it also encourages wider implementation of that TCBM.

4. Past and Current multilateral processes for space TCBMs

TCBMs have been employed in a number of terrestrial contexts for decades and played an especially important role during the Cold War. Although the use of the term “TCBM” in the space context is more a

more recent phenomenon, elements of TCBMs may be found in the existing international agreements on outer space, such as the 1967 Outer Space Treaty, the 1968 Rescue Agreement, the 1972 Liability Convention, and the 1975 Registration Convention. Other TCBMs relating to outer space, such as pre-launch notifications, notifications of manoeuvres and re-entries, and the sharing of information on national space activities and national space policies, are also already well established.

During the past ten years, there have been some multilateral efforts to start developing TCBMs for space. In 2013, the UN Group of Governmental Experts on Transparency and Confidence Building Measures in Outer Space Activities produced a consensus report on outer space transparency and confidence-building measures, which was adopted by the General Assembly without a vote. This report contained a number of pragmatic TCBMs mostly aimed at increasing transparency through exchange of information, notifications, etc. In 2019, following an 8-year process, the UN Committee on the Peaceful Uses of Outer Space (UN COPUOS) adopted a set of 21 consensus guidelines for the long-term sustainability of space activities. These guidelines address the policy, regulatory and operational safety aspects of space activities and many of them could be considered to be TCBMs. In 2022, pursuant to General Assembly resolution 76/231, the Open-Ended Working Group on Reducing Space Threats Through Norms, Rules and Principles of Responsible Behaviours was convened with a mandate to propose a set of norms, rules and principles of responsible behaviour in space. The recommendations from these processes are voluntary and non-binding in nature and many of them might be classed as space TCBMs.

5. Potential future space TCBMs

Given the advent of new types of commercial space activities and the inherently dual-use character of the capabilities associated with these new activities, it is possible to envisage what might be some potentially useful additional space TCBMs. Examples of such potential TCBMs for outer space activities include the following:

- Demonstrating commitment to the existing legal framework governing outer space activities, notably by signing and ratifying the Outer Space Treaty, Registration Convention, and Liability Convention, adopting national regulatory frameworks for space activities in conformity with the existing international

legal regime, and registering space objects, including military objects, in a timely manner in a national registry and with the UN;

- Providing transparency regarding plans and intentions for space activities, including military ones, such as prior notifications of launches, manoeuvres, and close approaches;
- Committing to refrain from non-consensual and uncoordinated rendezvous and close-proximity operations;
- Sharing information about national military policies, budgets and programs pertaining to space;
- Following existing best practices for orbital debris mitigation, including for military activities;
- Declaring a commitment to minimize as far as practicable the creation of long-lived orbital debris in the course of normal space operations;
- Declaring a commitment not to carry out activities that intentionally generate large amounts of orbital debris.

Although the above TCBMs would have greater normative weight if they were to be adopted and implemented multilaterally, there is nothing to prevent a State or group of like-minded States from adopting some or all of these TCBMs on a unilateral basis to demonstrate their commitment to being transparent about their space activities. As more States adopt a given TCBM and implement it consistently over time, indicating that they consider themselves bound by the commitment embodied in that TCBM, the more that TCBM will become an emerging international norm.

6. Conclusion

Transparency and Confidence-Building Measures are an important tool for reducing the risk of misperceptions and erroneous assessments of the activities of States in outer space, thereby fostering regional and global stability. TCBMs in outer space can take a variety of forms. They may be the elaboration of basic principles related to the exploration and peaceful uses of outer space, political measures related to establishing norms of conduct, information sharing to improve the transparency of outer space activities, operational measures which demonstrate a commitment to mutual cooperation in outer space, and consultative mechanisms aimed at information sharing. Though non-binding, when widely implemented by the international community, TCBMs can constitute emerging international norms that could themselves be the precursors for future legally binding instruments.

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