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Shared Risks

Presentation to the UN Disarmament Commission Working Group II [1]

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Introduction

UNIDIR was delighted to be invited by the UNDC to prepare a briefing that might generate some ideas and further thinking for the development of transparency and confidence-building measures for space activities (TCBMs). This topic has been the subject of many discussions in the UN, and we continue to see the need for TCBMs in space growing every day.

Today, more and more countries see counterspace capabilities as an essential part of their military forces. The ability to target and disrupt, or even destroy a space object is a logical corollary to the increased importance and reliance on space systems for military purposes. If armed forces can use satellites to coordinate troop movements, gather intelligence and even guide precision missiles, then it is not unthinkable that rivals should try to disable these satellites. The proliferation and diversification of space technologies is making this increasingly possible.

Despite the increased interest in counterspace capabilities, it is still a relatively small number of actors that are interested in developing such technologies, namely a few major militaries. By and large, most of the activities in space are still of a civilian or commercial nature. Indeed, most space actors give little thought to a possible arms race in space because of the idea that as long as you are not operating on a battlefield, the consequences of conflict will not reach you.

Yet nearly every country in the world faces certain *shared risks*, certain shared challenges related to space security that can impact or be impacted by any actor. This is due to the physical characteristics of space (namely orbital mechanics) and the intricate relationship between civilian and military space technology. In particular, there are three shared risks for all actors and beneficiaries of space technology:

- Space technology can be dual use or multi use,
- Space technology can be destructive,
- The policies behind space technology are often unclear.

While most countries or companies do not often think about anti-satellite missiles or suspicious on-orbit maneuvers, their own activities can shape or be shaped by tension growing in space among rivals because of these shared challenges. As such, it is imperative that we find ways to address space security challenges collectively.

[1] This presentation was prepared by Mr Daniel A Porras, Space Security Fellow, UNIDIR.

In this context, the 2013 Report of the GGE on Space TCBMs provided some useful ideas that could be implemented to reduce tension in space and improve conditions for sustainable space activities. These include:

- Notifications about on-orbit maneuvers,
- Notifications about intentional on-orbit breakups and
- Publication of information on national space policies.

These proposals can be unilaterally implemented by any country. They can also form the basis for establishing responsible norms of behavior. While they may not necessarily serve as a long-term solution to the threats growing in space, they may serve as a temporary short-term option that can be implemented right away in order to mitigate the possible effects of conflict on Earth to our most useful orbits. Prolonged widespread adherence to these TCBMs could also be crucial in creating the conditions for a legally binding instrument on the Prevention of an Arms Race in Outer Space.

Dual use and multi-use

I am sure that many of you have heard the term "dual use". Whilst it is not explicitly defined in any treaty, it is generally taken to mean that an object can be used for both military and civilian purposes. This is certainly true of space technology. Since the launch of Sputnik, satellites have been used to monitor the weather for both civilians and soldiers. Telecommunications satellites keep troops connected the same way as they do for businesses and families. Moreover, space technology has an additional dimension in that some can be used for both defensive and offensive purposes. For example, a missile interceptor can be used to intercept a missile or strike a passive satellite.

One particular piece of technology that encompasses all four of these dimensions is the on-orbit service vehicle. Today, new technology is enabling the development of small probes or drones that are highly maneuverable and can serve a wide variety of functions in orbit. This includes approaching satellites to refuel or repair them. These probes could also remove dead satellites from highly populated orbits, dragging them either up to a graveyard orbit or down to burn up in the atmosphere. Some are using these probes as a platform to design debris-removal capabilities, a function that we will certainly need if we intend to continue using the low-earth orbit the same way.

While these drones might have some highly useful applications, they can also have hostile ones. It should be recalled that the earliest proximity drones were designed by the Soviets as an anti-satellite (ASAT) capability. Several tests led to the Soviets destroying satellites in orbit by approaching them with a probe and then detonating an explosive charge. Today, public records indicate that on-orbit drones can intercept or jam radio communications, as well as potentially engage space objects with destructive capabilities.

So how do we distinguish between those on-orbit probes intended for peaceful purposes, such as those meant for debris removal, and those that are potentially hostile? The last year saw numerous accusations from several major space powers that hostile activities were taking place in orbit. However, a close examination revealed very little about the true nature of the activities in question. One person's "debris removal" experiment was another person's "space weapon". Moreover, it is not only States that are developing this technology, but civil institutions as well, such as the University of Surrey. While many in the West saw the recent testing of a "space harpoon" as a scientific endeavor, others saw it as further proof that even civilians are developing space weapons for their governments.

To ensure that co-orbital technology can continue to be used without raising tensions between rivals, one option that might be examined in the 2013 Report on Space TCBMs is found in §42. Here, the GGE proposed timely notifications to all States for scheduled maneuvers, particularly for those whose flight safety may be at risk. This proposal could be implemented by States engaging in or authorising proximity operations by the adoption of policies that give advance notice of co-orbital maneuvers. If a probe or drone will come within a certain distance of another object, there should be advance notice and consent from the object being approached. Such an arrangement would establish "safety zones", within which others should not fly without advanced notification and agreement. By so doing, States could ensure that the peaceful and utilitarian development of co-orbital technology is not misinterpreted as the development of a space weapon.

It should be noted that some in the private sector are already taking steps to address this issue. Mr Brian Weeden, from Secure World Foundation and the CONFERS project, spoke on this issue earlier this month during one of the UNIDIR briefings. You can find his presentation on our website.

Destructive capabilities

One of the biggest threats to all space objects today is space debris. This can be any of the trash or refuse left behind by legitimate activities, including dead satellites, spent rockets and parts of objects that have broken up in orbit. This debris continues moving around the Earth at velocities exceeding those of a bullet fired from a gun and can hit any object, be it military or civilian. The US Space Surveillance System currently tracks more than 23,000 objects in orbit that are larger than 10cm. 80% of this debris can be found in the Low Earth Orbit, where we also find many Earth observation and reconnaissance satellites, as well as the ISS. This is also where the future mega-constellations will reside.

Ordinarily, space debris is seen as a safety issue, and therefore should be dealt with in the Committee on the Peaceful Uses of Outer Space. However, one of the greatest concerns with a possible outbreak of conflict in space is that militaries will resort to destroying rival satellites in populated orbits, releasing so much debris that the orbits will become unusable. While there has never been the hostile destruction of a satellite in space, we have seen over the last decade that even testing of ASATs can have consequences full of debris. As such, space debris becomes a central issue in space security.

As many experts have noted, the 2007 Chinese ASAT test demonstrated the danger of mere testing. By destroying the Fengyun weather satellite with a missile interceptor at an altitude of nearly 900km, the Chinese military left behind more than 3,200 trackable pieces of debris. This debris will remain in orbit for decades, or even hundreds of years, unless it is removed. The following year, the US also shot down a defunct satellite, though this time at a much lower altitude of less than 250km. While there was much less debris generated in this test, there was still debris shot into much higher orbits which remained for around 18 months. The recent Indian ASAT test, Mission Shakti, which struck a television satellite at around 280km, also created debris that should be out of orbit within months. However, some of the 400 pieces of debris that were generated have traveled much higher, flying well over the international space station.

At present, there are no rules regarding the testing of conventional weapons in space. However, global reactions to these ASAT tests form the foundation for the argument that there are acceptable and unacceptable ways to conduct such tests. Altitude in particular is a determining factor.

The 2013 GGE report made a recommendation in §45 about the notification of intentional on-orbit breakups. It essentially contained three principles that can be summed up as follows:

- No debris: any activities that generate long-lived debris should be avoided;
- Low debris: if debris must be generated, measures should be taken so that it is not long lived;
- Notification: States should inform the international community about such measures.

These three principles could form the basis for ASAT test guidelines. As has been seen recently, States find value in demonstrating their ability to target and destroy objects in space. While this is not prohibited, the long-term effects of the debris could be considerable. ASAT test guidelines could be highly useful in ensuring that, so long as States feel it is necessary to develop ASATs, the consequences will not be felt by all space actors. They could also provide further legal certainty to the Liability Convention of 1972, which places liability for damage in space on the tortious notion of Fault.

Sharing space policies

Yet another major driver of tension between space actors at present is a lack of information about space objects. While current space tracking capabilities allow us to know the location of a space object (and even that is not perfect), we cannot always know what the object is or what it is for. There are certain registries intended to provide such information, such as the one provided for in the UN Registration Convention for Space Objects. However, this registry receives very general data and usually not till sometime after an object is launched and deployed. Registrations with the ITU are also publicly available, but military satellites are largely free from obligations under the ITU Constitution and Radio Regulations.

What results is a situation that contains a great deal of ambiguities and mistrust between space rivals. As noted above, the last year has seen a number of accusations among space actors, but it is impossible to find data or evidence that conclusively demonstrates the purpose of any object. While much of this doubt stems from our inability to know everything that is happening in space, part of this problem also stems from the fact that many countries do not share their space doctrines, policies or strategies. While not perfect, the sharing of space policies can be very helpful in putting space operations into context.

§37 of the 2013 GGE Report addresses this issue by proposing that States publish information about their national space policies. This requires a State to articulate its ambitions in writing to a certain degree. This would be especially useful if States were to publish their policies regarding counterspace capabilities. By having a better sense of how States see technology that targets and disrupts space objects, States can better interpret activities in space and have an understanding of red-lines. For example, States could give a clear message about how serious they view an attack on a space object, whether it amounts to a nuisance or a declaration of war. Publishing information about such policies could also go a long way towards avoiding misinterpretations and miscalculations when it comes to space objects. This could, by itself, go a long way to reducing tension in space.

Conclusions: Building momentum from the outside in

As noted in this presentation, there are at least three major challenges that face all space actors and beneficiaries:

- Space technology can be dual use or multi use,

- Space technology can be destructive,
- The policies behind space technology are unclear.

The 2013 GGE Report on Space TCBMs provides some useful ideas that could be operationalized today in such ways that reduce the risks to space security, even if only temporarily. These could include:

- Advance notifications for on-orbit maneuvers,
- ASAT test guidelines, and
- Publication of counterspace policies.

For some States, adopting these TCBMs could be very difficult, given their geopolitical interests and national security concerns. For others, especially those with no counterspace aspirations, adoption of such policies could be very straightforward.

The question remains: how can the majority of States that do not aspire to counterspace capabilities have any influence over those States that do? One solution might be found in the power of the purse. Today, there are many more options and choices when it comes to selecting space technology manufacturers, launch service providers and operators. Indeed, the majority of States are still acquiring space capabilities and must purchase either services or technology from others. One option might be for State beneficiaries to choose to purchase services or technology from States or companies that have implemented certain TCBMs or norms of responsible behavior. This would allow non-space actor States to pursue activities in a sustainable manner while encouraging others to adopt responsible norms. While not a perfect solution for the long run, such efforts, particularly if widespread and coordinated, could provide a necessary critical mass to promote sustainable behavior in space.

And this is all from me. If you have any questions, please feel free to refer to our briefing paper for the UNDC which is available on our web site.

Thank you.