Open-Ended Working Group on "Reducing space threats through norms, rules and principles of responsible behaviours"

Topic 3: Current and future space-to-space threats by States to space systems

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Mr Chair, Excellencies, distinguished delegates,

Introduction

Firstly, I would like to thank the Chair and the Secretariat of this Open-Ended Working Group for organising this panel and for inviting UNIDIR to be part of this important discussion. My name is Almudena Azcárate Ortega and I lead research on space security matters at UNIDIR. It is an honour to be part of such a distinguished group of panellists as the ones we have been hearing from during this week.

As we continue to discuss space-to-space threats today, the topic that I will be speaking about is something that has frequently been raised by States as an issue of concern, as is highlighted in the working paper that UNIDIR submitted for this session. The issue in question is the dual nature of many space systems, which States often refer to as "dual-use", but which, as I will explain throughout the course of this presentation, are actually two distinct categories of objects: dual-use and dual-purpose space systems. What exactly are dual-use and dual-purpose space systems, who operates them, under what circumstances can they be targeted under international law and what would be the consequences of their disruption, damage or destruction?

As it has already been mentioned this week, space systems are complex and made out of different segments, not all of which are located in space. However, for the purposes of this presentation, and since today's topic 3 is space-to-space threats, I will be focusing on the space segment.

What are States concerned about?

It is often said that space technology is increasingly essential to humankind, providing a multitude of services that are considered indispensable for the continued health, wealth and welfare of billions of people on Earth. Service-oriented infrastructure such as Global Navigation Satellite Systems, Earth Observation satellites and communication satellites are capable of carrying out a vast array of tasks that make many of the services we rely on everyday accessible to us: for example, satellites make safe navigation possible in the air, on land and at sea. Satellite services also allow humankind to have access to high-speed internet, carry out electronic financial transactions, as well as control and manage certain critical infrastructures and services, such as energy grids, water and transportation.

These same satellites are also used in the context of defence and security, that is to say they carry out military functions. It is important to recall that under outer space law, outer space shall be used only for "peaceful purposes". This has been generally understood to mean non-aggressive or non-hostile rather than non-military, and therefore there are many satellites that carry out military functions. Earth observation and remote sensing satellites, for example, provide militaries with intelligence, surveillance and reconnaissance data that enables militaries to identify adversary capabilities, track troop movements, and locate potential targets. They also provide information to facilitate disaster relief and humanitarian assistance operations. Communication satellites can provide encrypted communications and improve situational awareness, which allows military forces greater mobility. And positioning, navigation and timing satellite data allows for more precise and discriminate targeting for munitions as well as air, land, and sea navigation.

Such space systems that are used to carry out both military and civilian functions have been generally termed as "dual-use". This duality is a characteristic shared by many space systems that has been highlighted by many States as an issue of concern capable of threatening space security, due to the role these systems can play in fostering mistrust among space actors. States worry that the operational ambiguity of these objects could contribute to raising tensions among States. More specifically, States fear that military services provided by these dual-use assets could make them targetable by an adversary even when they also provide civilian or commercial services.

Separate from this concern, States have also expressed worries about technologies that are developed for commercial or civilian objectives of an entirely benign nature —such as on-orbit

servicing and refuelling, or active debris removal— but that due to their characteristics and capabilities —for example, having a robotic arm to repair satellites, or a harpoon or laser to remove space debris from orbit— could be repurposed to harm other space objects. These objects are developed to serve a solely non-military and non-aggressive purpose, but the potential they have to be repurposed to act as counterspace technology has caused many to include these objects under the "dual-use" umbrella. A more accurate term that is being increasingly used by some to refer to this second category of objects is "dual-purpose".

Two distinct categories of dual nature space objects: what are dual-use and dual-purpose objects?

Therefore, there are two distinct categories of space objects that States have expressed concerns about: dual-use on the one hand, and dual-purpose on the other hand. This distinction is important as the concerns stemming from the use of these objects are also different. They are perceived as two different threats, which therefore require different approaches.

The terms dual-use and dual-purpose are derived from the distinction established between use and purpose in the law of targeting. Under targeting regulations, only military objectives can be targeted. Military objectives can be identified by their nature, location, purpose or use. Purpose and use are the relevant identifiers in this case. "Use" is concerned with the present function of an object, while "purpose" is concerned with its intended future use.

- **Dual-use space objects**: they can have a military and security function, as well as a civilian or commercial one (either simultaneously or alternating. Alternate use is sometimes known as dual-capable). They can be operated by the military, even to provide services to civilians (examples include certain GNSS services). And they can also be operated by civilian or commercial actors, even to carry out military functions, as militaries can sometimes outsource certain services, particularly for satellite communications or remote sensing. These objects are known as "dual-use" precisely because they are intended to serve military and civilian functions.
- **Dual-purpose space objects**: they are designed to fulfil a benign objective (such as debris removal or on-orbit servicing), but they could potentially be repurposed to harm other space objects. They are generally operated by civilian entities, as well as commercial actors. They are generally developed with no military objective in mind, and are not intended to serve any aggressive function. However, their characteristics or capabilities —such as the possession of a robotic arm, for example— have raised concern that these

objects could be repurposed to be used against another satellite. It should be noted, however that the capabilities themselves are not what make these objects be perceived as a threat. In this sense, the term "capability neutral" has been used by some delegations, accurately reflecting that the capabilities of dual-purpose objects alone pose no danger to space actors. It is the challenge of discerning an operator's intent when utilising these assets what has led many to perceive the assets themselves as a threat, even when they are used in a relatively transparent manner.

Although dual-use and dual-purpose objects are different, they can share characteristics that could, in theory, cause them to qualify as both dual-use and purpose at the same time. For example, a dual-use satellite with manoeuvring capabilities could be repurposed to act as a counterspace weapon by causing it to manoeuvre so that it collides with another satellite. In practice, however, such situations would be relatively unlikely as it would be impractical and very costly.

Are dual-use and dual-purpose satellites targetable?

Before analysing whether dual-use and dual-purpose objects would be targetable it is important to recall that the Charter of the United Nations prohibits the use of force in its article 2(4). The only exception to this prohibition is the one enshrined in article 51 of the UN Charter, by which a State may exercise its inherent right of individual or collective self-defence in the case of an armed attack.

I will first focus on dual-purpose objects, as these are the ones that present a concern for States in terms of the possibility that they could be used to harm another satellite.

If the threshold of an armed attack indicated in article 51 of the UN Charter was reached (or could potentially be reached, for the purposes of anticipatory self-defence), it would theoretically be possible to target a dual-purpose object, provided that such action complied with key principles of the laws of targeting and the use of force.

Firstly, for the purposes of targeting, an object does not have a dual nature. It is either a targetable military objective or it is not. A dual-purpose object that was repurposed to attack a satellite, for example, would be considered targetable. In the cases of anticipatory self-defence, it should be taken into account that if intelligence is incomplete as to the repurposing of the object and thus as to its status as a targetable military objective, a mere hypothetical

repurposing would not turn the object into targetable military objective. Instead, there must be a certain reasonable probability that the object may be repurposed, the mere objective possibility of it is insufficient. This goes back to the idea of "capability neutral": just because an object has certain capabilities or characteristics, like a robotic arm, it does not automatically make it a threat.

Secondly, the self-defensive action that targeted a dual-purpose object would have to comply with the principles of necessity, proportional response, and timeliness.

- In accordance with the principle of necessity, the use of force is a last resort. The targeted State must ensure that there is no measure short of the use of military force that will effectively prevent a future attack, or the imminent attack.
- The principle of timeliness or imminence establishes that the act of self-defence must happen within reasonable proximity in time to the hostile act. It should not be an act of retaliation or provocation against the other, but rather of protection and defence of one's security. In the case of anticipatory self-defence, the action cannot be due to a mere hypothetical possibility of attack.
- The principle of proportionality or proportional response requires that the force used in self-defence be limited in scope, intensity and duration to that which is reasonably necessary to counter the attack or neutralise the threat. The harm that would be caused by the use of force in self-defence cannot be appreciably greater than the harm that would occur if the threat were not intercepted.
  The reasonably foreseeable reverberating effects of the attack must be considered as part of the proportionality analysis.

The consequences of targeting dual-purpose assets include the disruption (either temporary or permanent) of the services they provide: it could prevent the repair or refuel of a satellite in the case of an on-orbit servicing asset, for example. Depending on the method used to target the asset, there could be additional consequence, for example the creation of debris if kinetic force were used.

The consequences would be greater, and more deeply felt by people on Earth, if the targeted satellite were a dual-use satellite, as they provide many services of critical importance for life on Earth. I enumerated some examples at the beginning of my presentation: access to high-speed internet, or the possibility of carrying out electronic financial transactions etc. It is difficult to imagine a scenario in which dual-use space assets would be used to harm another satellite, since

as I described before, they do not really have aggressive capabilities. Their military functions mostly serve to assist military activities on Earth. However, targeting of these satellites is much more plausible in the context of an armed conflict on Earth. If dual-use space objects provided an effective contribution to military actions in the context of such conflict, and that effective contribution exceeded the relevance of the services provided to civilians, they could be targetable. This, known as the principle of distinction under international humanitarian law, would have to be considered in conjunction with other principles of IHL, such as military necessity, proportionality, and precautions. However, it should be noted that while most States agree that IHL applies to the outer space domain, some have expressed concerns about discussing its applicability. I will therefore not delve into the details of these principles at this time, but nevertheless underscore that these principles can serve to lend clarity to the targetability issue of space assets in the context of an armed conflict on Earth.

Conclusion

A proper understanding of dual-use and dual-purpose objects and their differences, coupled with increased transparency regarding their capabilities, but also regarding the way in which they are used is necessary to ascertain the threat they can pose. Only through such common understanding can the mitigation of these threats be truly effective. At UNIDIR we are committed to providing any assistance needed to reach common understanding on these issues. As always, we stand ready to support the work of this OEWG, and we will be happy to answer any questions its members may have.

Thank you very much for your attention.

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