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SPACE SECURITY: THE NEXT CHAPTER

CONFERENCE REPORT

7–8 MAY 2018

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About the organizers

The **United Nations Institute for Disarmament Research (UNIDIR)**—an autonomous institute within the United Nations—conducts research on disarmament and security. UNIDIR is based in Geneva, Switzerland, the centre for bilateral and multilateral disarmament and non-proliferation negotiations, and home of the Conference on Disarmament. The Institute explores current issues pertaining to the variety of existing and future armaments, as well as global diplomacy and local tensions and conflicts. Working with researchers, diplomats, government officials, NGOs and other institutions since 1980, UNIDIR acts as a bridge between the research community and governments. UNIDIR's activities are funded by contributions from governments and donor foundations.

Secure World Foundation is a private operating foundation dedicated to the secure and sustainable use of space for the benefit of Earth and all its peoples. Secure World Foundation works with governments; industry, international organizations, and civil society to develop and promote ideas and actions for international collaboration that achieve the secure, sustainable, and peaceful uses of outer space.

The Simons Foundation Canada is a private foundation committed to advancing positive change through education in peace, disarmament, international law, and human security. Dr Jennifer Allen Simons established The Simons Foundation Canada in 1985 to foster a greater understanding of global barriers to peace and to work with key parties on a common agenda. The Simons Foundation Canada has been a supporter of the UNIDIR Space Security Conference series since its inception as well as the principal NGO contributor to the Space Security Index, an annual publication surveying developments in the use of outer space relevant to its security and sustainability.

Note

This report was drawn up by Daniel Porras, and constitutes both a summary and analysis of the discussions and exchanges that took place at UNIDIR's Space Security Conference held at the Palais des Nations in Geneva on 7–8 May 2018. The views and opinions expressed in this document are the sole responsibility of UNIDIR and do not necessarily reflect those of the United Nations and its staff, of the Conference's co-organizers and sponsors, or of the participating entities and organizations.

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List of acronyms and abbreviations

ABM	Anti-Ballistic Missile
ASAT	Anti-Satellite
CD	Conference on Disarmament
CONFERS	Consortium for Execution of Rendezvous and Servicing Operations
COPUOS	United Nations Committee on the Peaceful Uses of Outer Space
DARPA	Defense Advanced Research Projects Agency
ESA	European Space Agency
EU	European Union
GGE	Group of Governmental Experts
ICBM	Intercontinental Ballistic Missile
ICoC	European Union draft International Code of Conduct for Outer Space Activities
ISS	International Space Station
ITU	International Telecommunication Union
LTS	COPUOS Long-Term Sustainability Guidelines
NFP	No First Placement of Weapons in Outer Space
OS18	2018 Space Security Conference
OST	Outer Space Treaty (1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies)
PAROS	Prevention of an Arms Race in Outer Space
PPWT	Draft Treaty on the prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects
RPOs	Rendezvous Proximity Operations
SSA	Space Situational Awareness
TCBMs	Transparency and Confidence-Building Measures
UNDC	United Nations Disarmament Commission
UAE	United Arab Emirates
US	United States
USSR	Union of Soviet Socialist Republics
WMDs	Weapons of Mass Destruction

Background

In the early 1980s, the United Nations began holding formal discussions on a new issue related to the prevention of an arms race in outer space (PAROS). This topic drew significant attention from many Member States worried that the rapid advances in science and technology had made the extension of the arms race into outer space a real possibility.¹ These discussions began at a propitious time for human space activities: just a few years earlier, Salyut 6, a Russian space station, had become operational; the first GPS satellite had just reached orbit; the first French-built Ariane rocket had successfully launched; and India had become the seventh nation capable of launching its own payloads into outer space.² Moreover, telecommunications operators were becoming increasingly important, with organizations like Intelsat, Inmarsat and Eutelsat gaining in prominence.

At this same time, the United States (US) and the Union of Soviet Socialist Republics (USSR) were engaged in a Cold War. Already, both countries had made significant strides in developing technology, such as missile interceptors and co-orbital drones, capable of striking objects in orbit. The international community became increasingly concerned that the use of such weapons might greatly disrupt space activities either through the direct targeting of space assets or by creating so much space debris as to render space activities unviable. In 1981, the United Nations General Assembly therefore requested the Conference on Disarmament (CD) to add PAROS to its agenda.³

While there was general agreement on the objective of preventing an arms race in outer space, there were diverse opinions on how to get there. At the 36th session of the General Assembly, two separate resolutions were tabled on this issue, demonstrating a division of opinions on the way forward: whether to pursue *“an effective and verifiable agreement to prohibit anti-satellite systems”* (A/RES/36/97C), or to pursue the *“conclusion on a treaty on the prohibition of the stationing of weapons of any kind in outer space”* (A/RES/36/99). The two blocs that first appeared in this meeting have largely remained, though the nature of the positions have evolved. Today, States are divided on whether there is an arms race in outer space and whether the existing framework of rules for space activities is sufficient to head off the possible outbreak of conflict in outer space. Some States strongly advocate the use of non-legally binding transparency and confidence building measures (TCBMs) as a means of moving towards legally binding measures on PAROS, while others see TCBMs as an end in and of themselves. As a result of not being able to agree on where negotiations should end up, after nearly forty years of work on PAROS, discussions seem stagnant.

Yet throughout the decades of deliberation, human space activities have continued to evolve. What was once the domain of telecommunication satellites now features actors engaged in remote sensing, geo-location and disaster management. Outer space capabilities have grown in prominence and today form an integral part of both civilian and military activities. Moreover, recent advances in technology miniaturization and the reduction of launch prices has resulted in a

¹ General Assembly, Final document of the 10th Special Session on Disarmament, 30 June 1978 (A/RES/S-10/2), para. 80.

² See Space News, "Timeline: 50 Years of Spaceflight", 28 September 2012. Available at <https://www.space.com/4422-timeline-50-years-spaceflight.html>.

³ General Assembly resolution, 9 December 1981 (A/RES/36/97C), para. 3.

torrent of new space actors, particularly private ones, whose endeavours are anticipated to double, and perhaps triple the value of the space market.⁴

In the wake of such developments, there is a renewed sense of urgency among the international community to resume substantive work on the issue of PAROS to ensure the viability of Earth's orbits. In December 2017, a Group of Governmental Experts (GGE) was established with the mandate "to consider and make recommendations on substantial elements of an international legally binding instrument on PAROS, including, *inter alia*, on the prevention of the placement of weapons in outer space."⁵ Subsequently, in February 2018, the CD set up subsidiary working groups to find means of advancing each of its individual agenda items, including PAROS.⁶ This is in addition to the work being done by the United Nations Disarmament Commission (UNDC) on the practical implementation of TCBMs,⁷ as well as the work of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) on long-term sustainability guidelines.⁸ These renewed efforts have been spurred on by the recognition "that the prevention of an arms race, especially of the placement of weapons in outer space, would avert a grave danger for international peace and security."⁹ Indeed, these new initiatives offer an opportunity for the international community to begin a new chapter in the dialogues around the PAROS issue.

In this context, the United Nations Institute for Disarmament Research (UNIDIR) brought together a wide spectrum of stakeholders who are building up the space economy and improving human lives on Earth. The 2018 Space Security Conference featured experts from Governments, private companies and civil society, hailing from all over the world. Together, these participants engaged in a productive discussion on the effectiveness of the existing space regime for new realities in the space environment. The aim was to determine whether current instruments are sufficient to ensure the growth of human space activities and, if possible, to provide suggestions on how to enhance the existing regime to avoid disruption. Whilst it was clear from the deliberations that divisions of opinion still exist on the manner in which space security should be enhanced, the objective remains widely accepted: to ensure the long-term sustainability of human space activities.

Conference Overview

Each year, UNIDIR hosts an Outer Space Security Conference to provide stakeholders with an overview of current space security initiatives, an update on implementation and adherence to existing instruments and a view of the way ahead. On the seventh and eighth of May 2018, UNIDIR and its partners Secure World Foundation and The Simons Foundation Canada convened the 2018 Space Security Conference, entitled Space Security: The Next Chapter (OS18), the seventeenth instalment of the Conference series. The event was sponsored by the Governments

⁴ Michael Sheetz, "The space industry will be worth nearly \$3 trillion in 30 years, Bank of America predicts", CNBC, 31 October 2017. Available at <https://www.cnbc.com/2017/10/31/the-space-industry-will-be-worth-nearly-3-trillion-in-30-years-bank-of-america-predicts.html>.

⁵ General Assembly resolution, 24 December 2017 (A/RES/72/50) http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/72/250.

⁶ Conference on Disarmament, decision adopted at the 1442nd plenary meeting on 16 February 2018 (CD/2119).

⁷ See UNDC, Secretariat non-paper for Working Group II, 2018. Available at <https://www.un.org/disarmament/institutions/disarmament-commission/session-2018/>.

⁸ Conference room paper by the Chair of the Working Group on the Long-term Sustainability of Outer Space Activities, Vienna, 8 February 2018 (A/AC.105/C.1/2018/CRP.18/Rev.1).

⁹ General Assembly resolution, 24 December 2017 (A/RES/72/250).

of the People's Republic of China (China) and the Russian Federation. Government officials, the private sector and civil society all contributed to lively debates and put forth a number of suggestions that could serve as the basis for future discussions. It should be noted that, while presentations by participants were on the record, discussions throughout OS18 were carried out under the Chatham House Rule, a rule or principle according to which "participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed".¹⁰

OS18 was comprised of six panels, with remarks from two special guests. The topics were as follows:

- National and Regional Approaches to Space Security
- Coming into Focus: a look at the maturing space economy
- Established Regimes, New Realities: are existing rules and practices enough?
- Space Security for People on Earth
- Emerging Challenges
- Searching for Viable Steps: gauging options big and small

The diverse perspectives of experts at OS18 demonstrated that stakeholders across a wide spectrum share a common interest: the preservation of outer space—and particularly Earth's orbits—as a viable environment for human activities. In this context, it was generally agreed that all actors should take advantage of renewed efforts at the United Nations level to address space security challenges in a cooperative manner.

Summary and Analysis

Day 1: Opening Session

Welcoming Remarks

- Dr Renata DWAN, Director, UNIDIR
- Ms Victoria SAMSON, Washington Office Director, Secure World Foundation

Opening Address

- Mr Michael MØLLER, Director-General, United Nations Office at Geneva

Dr Renata Dwan opened the Conference by noting that this was an auspicious time for outer space security, as new diplomatic interest in space was reviving debates that had been underway for several years, but had seemingly stalled. Growing global dependence on space capabilities and looming uncertainties about related activities had reinvigorated discussions within the United Nations system. In particular, the establishment of a new GGE on PAROS, as well as the new Subsidiary Body 3 of the CD, represented two concrete opportunities to find practical solutions to space security threats. Indeed, these discussions would be particularly important as distinctions between civilian and military uses of outer space continued to blur, requiring a multitude of inputs from Governments, academia and the private sector.

Ms Victoria Samson also acknowledged the on-going diversification of outer space and the growing interdependence between stability on Earth and in orbit. Noting that governments were

¹⁰ See <https://www.chathamhouse.org/chatham-house-rule>.

no longer the only actors in space, she stressed the need for inclusivity in the search for solutions to space security threats. In this context, Ms Samson warned of new applications for space technology that could be highly disruptive, and that the disarmament community needed to rethink how it approached threats in this domain. She pointed to increased “space situational awareness”¹¹ as one option for increasing transparency and confidence in outer space. Moreover, she concurred with Dr Dwan that space applications were increasingly of a dual-use nature and that any discussions on responsible norms of behaviour had to include all stakeholders, including those dealing with “peaceful activities” and those dealing with disarmament.

Mr Michael Møller reflected on the ubiquitous nature of satellites in today’s modern world. From GPS to telecommunications the whole world depended on satellite communications. Mr Møller warned that the growth of space activities around the Earth could not go on forever and it would be important to work together to solve new space security challenges. Yet while we may have had the technical knowledge to solve these problems, we lacked the political will and trust needed to do so. In this context, Mr Møller reiterated that space actors had to create partnerships and cooperation in space, not competition, noting that the 2030 Development Agenda provided a useful philosophy to achieve this end: we really are all in this together, and no one wins unless everyone wins. Mr Møller ended by recalling that “*sputnik*”, in Russian, means “traveling companion” and that we were all *sputniki* in this world.

Panel 1. National and Regional Approaches to Space Security

Chair: Dr Renata DWAN, Director, UNIDIR

Panellists:

- Mr Andrey GREBENSCHIKOV, Ministry of Foreign Affairs, Russian Federation
- Mr Georges SCHMIT, Special Envoy of the Government of Luxembourg, SpaceResources.lu
- Mr Hatem ELATAWY, Deputy Director, Cairo International Center for Conflict Resolution, Peacekeeping and Peacebuilding
- Mr FU Cong, Ambassador for Disarmament Affairs, Deputy Permanent Representative, Permanent Mission of the People’s Republic of China to the United Nations Office at Geneva and Other International Organizations in Switzerland

The first panellist, *Mr Andrey Grebenschikov* brought a number of key policy documents to the attention of the Conference as the basis for Russian space policies: the Russian Constitution, the Fundamentals of the State Policy in the Area of Space Activities, the National Security Strategy, the Foreign Policy Concept and the Military Doctrine. First, the Russian Constitution acted as the basis for all space activities and directly informed the Russian Federation’s position that outer space should be a rule-based environment. Next, the Fundamentals of the State Policy informed Russian activities such as international cooperation, including the creation of launch vehicles and spacecraft, promotion of the global navigation system GLONASS abroad,¹² and participation in the International Space Station (ISS) programme. The three documents Mr Grebenschikov discussed were relatively recent, having been adopted since 2014. Under the National Security Strategy, the weaponization of outer space was classified as one of the main external military threats to Russian national security. For this reason, the Foreign Policy Concept gave high priority to work on the prevention of an arms race in outer space. The Military Doctrine, the most significant of the three

¹¹ Space situational awareness is understood as knowledge of the population of space objects and any existing threats/risks found in the space environment.

¹² GLONASS is a Russian version of GPS. For more information, see for instance NovAtel’s description. Available at <https://www.novatel.com/an-introduction-to-gnss/chapter-3-satellite-systems/glonass/>.

documents, underscored the importance of countering efforts by any State or group of States to achieve military superiority in outer space. This document set out several clear tasks, including: concluding a treaty on PAROS, reaching a normative United Nations agreement on the safe conduct of space activities and strengthening Russian capacity for monitoring objects and events in “near-Earth” space.

Mr Grebenschikov recalled that the Russian Federation and China had submitted a joint proposal for a possible Treaty on the Prevention of Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT), and that it was still the Russian position that such a treaty was the only credible guarantee that outer space would remain peaceful and free for exploration by all. In addition, Mr Grebenschikov drew attention to the unilateral declarations made by states in the General Assembly regarding “No First Placement of Weapons in Outer Space” (NFP). This initiative was meant to strengthen international security and enhance strategic and regional stability by encouraging States to commit themselves not to be the first to place weapons in outer space. The initiative was seen by the Russian Federation as an interim measure, pending a future legally binding agreement on PAROS.

Mr Grebenschikov noted that the Russian Federation was increasingly concerned by one State’s plans to deploy strike weapons in outer space, taking advantage of security tensions on Earth as a pretext to escalate tensions in outer space. Acknowledging that there were still gaps in understanding how Article 51 of the United Nations Charter applied to outer space, the Russian Federation had proposed elaborating on this topic within the context of COPUOS. However, there had been no interest thus far to engage in this discussion. In this context, Mr Grebenschikov applauded Member States for agreeing to launch new initiatives on PAROS.

Mr Georges Schmit discussed the unique approach of his country, Luxembourg, to leverage private space activities. Over the last 30 years, Luxembourg had been home to some of the largest satellite operators, such as SES. In 2016, the Government announced a new space resources initiative to take advantage of new capabilities to conduct “space mining” operations on the Moon and asteroids. In particular, Luxembourg planned to continue its leadership in satellite communications, generate new economic value and strengthen international cooperation. Mr Schmit stressed that Luxembourg’s aims in outer space were strictly of a peaceful nature.

In discussing the reason for all this investment, Mr Schmit noted that many countries are setting their sights on deep space exploration and Luxembourg believed that this would produce a profitable business model. Notably, the utilization of *in-situ* resources such as ice on the Moon would become an important part of the future space economy. Furthermore, Mr Schmit noted that technological developments in space often led to innovations here on Earth. He acknowledged that there were many challenges left before Luxembourg’s goals in space could be achieved, including on technical, business and governance issues. To this end, the Government of Luxembourg had developed a strategy to promote dialogue, develop talent, make long-term investments in space exploration and build a regulatory regime.

Mr Hatem Elatawy discussed the significant developments taking place across Africa and the Arab World. He noted that, at present, there was a sense of need for cooperation across this region and that many of the national space programmes were seeking to build upon each other. In Africa, this sentiment had led to discussions on the formation of an African Space Agency, to include countries such as Egypt, South Africa, Algeria, Nigeria, Ghana and others. There had also been discussions about establishing a Pan-Arab Space Agency, which would include the United Arab Emirates (UAE), Algeria, Saudi Arabia and others. While discussions on the Arab Space Agency had stalled, there was hope for an African Space Agency in the future.

Mr Elatawy noted that African and Arab countries had had interests in space for many years, but emerging economic opportunities were generating renewed efforts to be invested in space activities. This included applications such as remote sensing, environmental monitoring, archaeology and technological developments. Mr Elatawy also noted the difficult security challenges on Earth that could be overcome with space capabilities, including terrorism, human trafficking and the smuggling of migrants. The countries in this region, therefore, held certain common priorities. First, they wanted to ensure equal rights to develop a full space cycle (design, launch and operation). Secondly, they wanted to participate more closely in international cooperation, particularly on the development of best practices and space debris mitigation. Finally, they considered space to be the common heritage of humankind and that all had a right to economic utilization of space resources. Notably, Mr Elatawy stressed the importance of ensuring a resource utilization regime where the benefit of one would not be harmful to another.

Finally, *Ambassador Fu Cong* introduced the Chinese approach to space security. The Ambassador began by acknowledging the important contribution of the Space Security Conference to dialogues on the many challenges facing space activities. While the world had seen many technological changes in space activities, the United Nations had also achieved a breakthrough in the formation of various groups to address issues such as PAROS, including the GGE on PAROS, CD Subsidiary Body 3 on PAROS and the UNDC. The Ambassador welcomed these developments and stated that China hoped for tangible results.

In this context, the Ambassador expressed China's grave concern over threats to space security, particularly space debris and the risk of space becoming a battlefield. He noted that once weapons entered outer space, mutual trust would be permanently damaged and an arms race would become inevitable. He warned that the breakout of a war in space could render all other activities unviable. To this end, he stressed that the CD was indeed the most appropriate venue for discussing a legally binding instrument on PAROS. The very purpose of establishing a new GGE was to consider and make recommendations on how to achieve this objective. The Ambassador invited additional input into the discussion on PAROS and welcomed the discussions at the UNDC as a positive contribution. While the Chinese Government saw TCBMs as being useful intermediary steps, the Ambassador reiterated that the ultimate goal should be to adopt a treaty on PAROS, and the PPWT should serve as the basis for discussions on this matter.

Discussion

There was discussion, first, on the current state of relations between major space powers. It was acknowledged that while bilateral discussions on issues related to space security were ongoing, there was no progress to be reported. There were also questions about new types of national legislation emerging for space resource utilization and whether it would be more appropriate to regulate at the national or international level. It was expressed that such activities would require cooperation on both levels and that it would be important to include all stakeholders, such as private entities.

Concerns were also shared that the use of the term "self-defence" in the outer space context was still extremely vague, but it was the hope of many that space would remain strictly for peaceful purposes. There was also some discussion on whether an arms race presently existed in outer space. One participant noted that the term "competition" was probably more appropriate for the current situation in space, but that an arms race needed to be avoided. Another noted that the PPWT sought to ban deployment and use of weapons in space all together because this would render research and development of space weapons pointless.

Panel 2. Coming into Focus: a look at the maturing space economy

Chair: Mr Naser AL RASHEDI, Director, Space Policy and Regulations, UAE Space Agency

Panellists:

- Ms Neha SATAK, Co-Founder and CEO, Astrome Technologies
 - Satellite Broadband: deploying broadband to the Southern Hemisphere
- Mr Andrew RUSH, President/CEO, Made in Space, Inc.
 - Space Manufacturing
- Mr Peter BECK, CEO, Rocket Lab
 - Small Satellite Launch Vehicles
- Ms Victoria SAMSON, Director, Washington Office, Secure World Foundation
 - Rendezvous and Proximity Operations (RPOs)

The Chair of the next panel opened with a presentation of some of the notable achievements made by the United Arab Emirates (UAE) in recent years. In particular, he pointed to policies such as leadership endorsements, effective space policies, capacity building, women's empowerment and the strengthening of international cooperation as some of the pillars on which the UAE was building its space capabilities.

Ms Neha Satak introduced her company's vision of providing broadband Internet to the world, particularly for poor rural regions where infrastructure was still lacking. She noted that most methods of deploying Internet were far too costly for poor, sparsely populated areas, which were continually being left behind in the information age. Ms Satak noted that there were three reasons why her company was acting now on this project. First, the demand for Internet was growing exponentially, particularly as the "Internet of Things" was becoming a reality.¹³ Secondly, transponder technology had improved dramatically, allowing faster delivery of data through satellites. Thirdly, private launch companies were greatly reducing the cost of access to space. In this context, Astrome Technologies saw a viable business plan to launch a constellation of 200 satellites that could service the "Southern Hemisphere", including Southeast Asia, South America and Australia. Telecom operators in those regions would be able to deploy 3G and 4G network towers easily and cheaply in rural and remote areas. Her company planned to have services available by 2020.

Mr Andrew Rush gave a presentation about his company, Made in Space, a firm focused on 3-D printing in outer space. He explained that his company was started because it was still expensive to take cargo into space and it was much more cost effective to have a printer that could convert material into specific objects. Mr Rush noted that his company was presently working to utilize the space environment to make objects such as optical glasses, metal processing and even bioprinting. Mr Rush added that the potential profits from producing objects in micro-gravity—such as fibre-optic cables—could accommodate the economic cost of flying the materials to and from low Earth orbit. While at present, Made in Space was only using autonomous devices that produce goods (such as the one already on-board the ISS), it is envisaged that one day there will be full-scale factories in orbit with human workers on board.

Mr Peter Beck presented his company, which manufactures and launches small-satellite rockets. He noted that satellite technology had become increasingly small, allowing for new types of spacecrafts that could fill a new market niche. While many of today's rockets were very large and

¹³ The Internet of Things refers to the interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data. Examples include cars, televisions and refrigerators.

could take weeks or months to launch again, Rocket Lab had developed much smaller rockets that launched with a frequency not of months but of hours. Rocket Lab had set itself a goal of launching one rocket each month throughout 2018, and one rocket every week throughout 2019. Mr Beck also noted that his company used a 3-D printer to manufacture the majority of the parts for their rocket engines. Mr Beck acknowledged that space sustainability was critical for the success of his and every other space business. Rocket Lab had therefore adopted several technical strategies to ensure that their used rocket stages did not remain in orbit indefinitely, but de-orbited in a matter of months. Mr Beck stressed that decisions taken in the next five years could be judged for the next thousand years and so it was important to have good long-term policies that took the sustainability of space activities into account.

Finally, *Ms Victoria Samson* discussed rendezvous proximity operations (RPOs), namely close approaches from one space object to another. These operations would enable on-orbit servicing of satellites, potentially providing fuel, repairs or de-orbiting defunct satellites. She drew attention to two types of RPOs: those with two-way exchanges of information (between two functioning space objects) and those with non-cooperative ones (e.g. space debris removal). These services would greatly increase the viability of and benefits from space activities. However, it did raise a number of diplomatic, legal, safety and policy challenges. Ms Samson noted that there were no specific policies on these types of activities, other than general obligations under instruments like the Outer Space Treaty (OST).¹⁴ While she acknowledged that there was something of an existing regulatory framework for RPOs built from best practices—developed over fifty years of RPOs and carried out by actors from numerous countries—norms needed to be developed to establish a vibrant RPO industry.

Ms Samson said that one form of developing norms would be to further leverage all the best practices that have emerged from both Government and industry in order to establish non-legally binding standards for cooperative RPOs. Such standards could form the foundation on which new space capabilities could be formed. Ms Samson concluded by noting that the Secure World Foundation was presently part of the Consortium for Execution of Rendezvous and Servicing Operations (CONFERS), a project established by the US Defense Advanced Research Projects Agency (DARPA). This project enabled the commercial sector to discuss and develop standards and norms for sustainable RPOs. CONFERS was intended to transition into a fully privately funded programme in the coming years.

Discussion

There were several questions about the drivers behind growth in the space economy, particularly behind the growth in small- and medium-sized businesses. Some were of the opinion that there was a natural progression for how industries evolve. This process started with Government investment in infrastructure, which then became the foundation for private sector activities. One example was the ISS, where numerous companies were presently testing prototypes for new technology. Others added that private industry was better at developing sustainable business models whereas Government actors did not worry so much about costs. It was generally felt that Governments should use a light touch to regulate the space industry in order to continue stimulating growth, and that such regulations should be standardized across national boundaries as much as possible. At the international level, some stated that the current regime was not

¹⁴ Under Article VI of the 1967 Outer Space Treaty (Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies), States are responsible for the authorization and supervision of their nationals in outer space. Under Article VII, States are internationally liable for damage to another State Party or to its nationals.

sufficiently applied and that further measures needed to be taken to ensure the long-term sustainability of human space activities. There was some doubt expressed about the role that the private sector could play on issues related to space and national security, though some noted that commercial actors could be very helpful in finding ways to carry out space activities without unnecessarily raising tensions.

Panel 3. Established Regimes, New Realities: are existing rules and practices enough?

Chair: Ms Kerstin VIGNARD, Deputy to the Director and Chief of Operations, UNIDIR

Panellists:

- Dr Guoyu WANG, Deputy Director, Institute of Space Law, Beijing Institute of Technology
 - The Outer Space Treaty and its Role in Modern Space Security
- Ms Karoline MARBURGER, German Aerospace Center (DLR)
 - Evaluating the Role of Consensus Within the United Nations System
- Ambassador (Ret.) Mr Paul MEYER, Senior Fellow, The Simons Foundation
 - Do Space Transparency and Confidence-Building Measures Have a Future?
- Dr Asha BALAKRISHNAN, Core Staff Member, Science and Technology Policy Institute
 - Space Situational Awareness Data Sharing: reviewing old methods and new capabilities

The first panellist, *Dr Guoyu Wang*, discussed some of the challenges in effectively applying the OST to the current space security context. One of the main challenges lay in applying terms across many languages. He pointed out that translations could not be isolated from culture, so care had to be given to correctly defining terms, particularly when discussing connotative meanings. For example, the term “safety” referred to freedom from damage and the term “security” referred to freedom from threats. However, these terms overlapped and were not mutually exclusive, particularly in languages other than English. Dr Wang also noted that the term “space security” was often used to denote freedom of space activities/infrastructure from threats. While the freedom from harmful acts in space security was an “acts-oriented” regime, the initiative of PAROS was an “object-oriented” one, and the approach might need to be re-examined.

Dr Wang examined Article IV of the OST, which acted as a limited form of arms control in space. Specifically, it banned the placement of nuclear weapons or other weapons of mass destruction (WMDs) in orbit around the Earth and their installation on the Moon or other celestial bodies. The OST was silent, however, on a number of points. It also did not define a WMD, nor whether such a weapon might be used in outer space. It was also silent on whether nuclear weapons or WMDs could be placed anywhere else in space or if space resources might be used in the production of weapons. Moreover, it did not mention the matter of conventional weapons and anti-satellite (ASAT) weapons. Dr Wang further noted that there were ambiguities in the OST regarding unilateral behaviour, such as RPOs, active debris removal and controlled re-entry.

Furthermore, Dr Wang noted that while Article III of the OST stated explicitly that all space activities were subject to international law, including to the United Nations Charter, it left gaps that had not yet been resolved, such as when the use of force might be allowed as a legitimate form of self-defence. The OST did provide for some TCBMs to deal with these ambiguities—namely within Article VIII (retention of jurisdiction; obligation to return foreign objects), Article X (opportunities to observe flights), Article XI (informing the United Nations and the scientific community about space activities) and Article XII (visits to space stations and installations)—but these were very broad in nature and did not set out any specific obligations. OST also lacked any form of verification measures/institutions, so it was not actually possible to enforce many of its

provisions. Despite so many ambiguities, Dr Wang concluded that the OST had withstood the test of time and should continue to be the basis of space activities. To this end, Dr Wang concluded that the “way out” was to continue open dialogues. Even if an arms race could not be stopped, there could be an orderly framework for “controlled results”.

Next, *Ms Karoline Marburger* offered an examination of the use of consensus—understood as decisions without voting—within United Nations bodies dealing with space activities. She started by noting that the League of Nations had operated under a rule of unanimity but that this led to very few agreements being reached. The United Nations, therefore, opted for a different rule, namely that of a majority, but still seeks to achieve consensus as a general principle. The benefit of consensus was that, ideally, more progressive and cooperative outcomes were favoured by all. From a pragmatic perspective, consensus came when only a dominant section of a working body supported a given position.

Ms Marburger drew attention to the achievements reached with consensus by certain United Nations bodies. COPUOS had adopted five outer space treaties, five sets of principles and other non-legally binding instruments. She noted that the CD and its predecessors had adopted six international instruments on disarmament issues, though none of these was related to outer space. Ms Marburger noted that “productivity” in these bodies had slowed down significantly since the end of the 1970’s. Two possible reasons were that the most pressing issues had already been settled, or that there was no further political/economic will to find solutions on the remaining issues. However, this was due to incentives and not due to deficiencies in the mechanisms of the United Nations.

Ms Marburger pointed to certain key features of existing multilateral mechanisms that could facilitate substantive work in the United Nations bodies. First, Working Groups were useful for providing private, informal settings. Secondly, the Chair could play a vital role in reaching common understandings. Thirdly, putting contentious terms or provisions in brackets could help move on to other issues without bringing an entire process to a halt. Fourthly, consultative meetings could also be useful for even more informal and private settings. Ms Marburger emphasized the role of the Chair as being especially important and wondered if consistency in leadership might not be missing from modern dialogues. As evidence, she noted that in the early years of work on space in the United Nations, Chairs were appointed for terms of six to eight years, whereas today they are appointed for a term of only two years. In conclusion, Ms Marburger stated that consensus still had a role to play in the United Nations and that if the political will to reach new agreements existed; the United Nations was still the right forum for such negotiations.

Next, *Ambassador (ret.) Mr Paul Meyer* discussed TCBMs as a desirable means of achieving Member States’ space security objectives. He noted that the CD had been experiencing a paralysis for twenty years and had therefore made very little official progress on its agenda. In particular, any formal discussion of the Russian-Chinese draft PPWT had been stymied by the situation within the CD, as well as the criticisms of the draft by the United States (US) that the treaty was not verifiable and did not cover ground-based anti-satellite weapons. This was particularly concerning as the development of ASAT technology was resurging.

In this context, Ambassador Meyer found it remarkable that in 2013, the General Assembly GGE on TCBMS for outer space was able to reach consensus on a substantive report, recommending TCBMs as a means of helping both to prevent military confrontation and to foster regional and global stability. These TCBMs set out specific proposals, such as information exchange and risk reduction measures, as well as enumerating criteria to apply to future TCBMs. One GGE recommendation that had subsequently materialized was the joint meeting of the First and Fourth

Committees of the General Assembly to discuss possible challenges to space security and sustainability. Such joint meetings took place in 2015 and again in 2017.

Ambassador Meyer lamented, however, that this joint meeting had been one of the few concrete developments, since the GGE report had largely not been acted upon. Furthermore, there were few signs indicating a common view of the way forward. The resolution put forward by the Russian Federation and Argentina on NFP had received significant pushback because it was seen as not being in line with the criteria for TCBMs set out in the GGE report and because it could be interpreted as justifying the second or third placement of weapons in space. Another once-promising proposal, the European Union's (EU) draft International Code of Conduct for Outer Space Activities (ICoC), had been rejected for lack of a mandate for an inclusive, consensus-based negotiation under United Nations auspices.

Despite these problems, new initiatives had lately emerged in the United Nations that could be useful in furthering discussions. First, as noted above, the new GGE on PAROS, established by the Secretary General, could be an opportunity to hold a substantive discussion on prospects for a legally binding instrument free from the CD blockage. Secondly, there were two vehicles that would be well suited for the further development of TCBMs: Subsidiary Body 3 of the CD on the topic of PAROS, and the UNDC Working Group II on the practical implementation of TCBMs. While the past track records did not inspire confidence that any of these groups would succeed, Ambassador Meyer suggested that all constructive avenues should be pursued. Private sector and civil society actors could be included in official discussions, authorization of a multilateral "Code of Conduct" could be initiated at the General Assembly, or ways of implementing already identified TCBMs could be found. In any case, Ambassador Meyer stressed that an active, rather than a passive, approach to space security diplomacy was called for.

The final panellist, *Dr Asha Balakrishnan* made a presentation about the framework under which space situational awareness (SSA) data was used and shared globally. This was of particular importance as Earth's orbits were set to become significantly more populated in the coming years. In addition, new telescope capabilities would allow people to see more objects in Earth's orbits, increasing awareness of "space traffic". The Science and Technology Policy Institute had created four models for how this data could be shared among global space stakeholders, and conducted over 70 interviews with government officials, academia and industry to see which of these models were most desirable. These models, or scenarios, moved along two axes: degree of internationalization and degree of privatization. Scenario 1 featured an extension of the current US-led system, under which the US Government issued data to other Governments and private actors. Scenario 2 featured a system led by US private entities, which then issued data to Governments and operators as "clients". Scenario 3 consisted of a globally governed SSA system, where an international body acted as both repository and distributor of SSA data. Finally, Scenario 4 contemplated individualized SSA systems for each country.

Dr Balakrishnan's study found that Scenario 1 was the most realistic, as it essentially was a continuation of the current SSA data-sharing set-up, but also the least desirable because most stakeholders would have the least amount of control over SSA data. Scenario 4 was realistic for some countries, but most did not want the US Government to cease providing free SSA data. While Scenario 3 seemed the most desirable to the space community, it was also the least likely due to challenges in international negotiations, the limited resources of some countries and US hesitance to be guided by an international body. Dr Balakrishnan concluded that Scenarios 1 and 4 were the most viable if the focus was on security issues, but that Scenario 3 was the most viable if the focus was on the preservation of the space environment.

Discussion

Discussions centred on finding mutual interests that could lead to cooperation. Some felt that industry should be given a greater role in the search for viable solutions to space security challenges. There was also some debate over the usefulness of the term “soft law” and whether it would be better to refer only to best practices. However, it was expressed that while best practices informed how activities were carried out, they did not provide guidance on a direction for laws and policies.

Panel 4. Space Security for People on Earth

Chair: Ambassador Ms Yvette STEVENS, Ambassador Extraordinary and Plenipotentiary Permanent Representative of the Republic of Sierra Leone to the United Nations Office and other international organizations in Geneva

Panellists:

- Mr Keith GARRETT, Senior Geographer, Geospatial Operations, World Bank Group
 - Space and Poverty: using Earth observation to tackle poverty driven security issues
- Mr Antonio CICCOLELLA, Head of the ESA System Architecture Office Directorate of Earth Observation Programmes
 - Space and Environmental Security
- Ms Sara LANGSTON, CEO and Principal Consultant, Senmurv Consulting LLC
 - Space Security and Gender: incorporating the gender perspective into decision-making processes

The Chair for Panel 4 introduced the panel by noting that space applications had a great deal to offer the world, such as in the achievement of the United Nations Sustainable Development Goals. In particular, space could influence the way that decisions were made regarding security challenges on Earth. Likewise, human decisions lay at the heart of all space security developments. For this reason, it was important to examine the relationship between space, security and people in the decisions taken on issues related to all types of security.

Mr Keith Garrett demonstrated numerous examples of how space technology was used to relieve conflict tensions on Earth. First, he demonstrated how the World Bank was able to use satellite images to survey the extent of economic damage in Syria by observing the housing population. In Bangladesh, images had been used to monitor the deterioration of the environment, leading to water pollution. Mr Garrett noted that while these capabilities existed, there was still not sufficient use of data in policy making. The World Bank had made efforts to integrate geospatial data into its operations, particularly to be able to extend access to finance to under-developed areas. Mr Garrett noted that it would be critical for this information to remain publicly available so that it could be more widely used.

Next, *Mr Antonio Ciccolella* discussed the ways that the European Space Agency (ESA) used geospatial data to combat environmental security issues. He began by acknowledging that “environmental security” was a relatively new term that referred to certain trends that threatened stability, but these could be monitored from space (e.g. loss of rainforests, greenhouse gases, rising sea-level). To this end, the ESA had three pillars of activities: scientific, geo-positioning (Copernicus) and meteorology. He noted that the types of data that could be gathered were only limited by human imagination, but how it was used still required refining. Mr Ciccolella stated that the EU incorporated as much of this data as possible into its decision-making processes, more so in recent years as the utility of space was better understood. For example, the EU used much of this

data to make decisions regarding the adoption of COP21, an initiative to keep carbon emissions down. Mr Ciccolella reminded the audience that the ESA offered all of its data free on its website.

Finally, *Ms Sara Langston* discussed the importance of including the gender perspective in decision-making processes for space activities. This included all areas, such as government and civil, peaceful and security related. She stated that values impacted the way people pursued their goals, and more role models were therefore needed in space activities. Women, in particular, offered forward thinking on numerous fronts, introducing a distinct form of problem analysis from that of men. While great minds often think alike, they also think differently. The gender perspective was about introducing a different way of thinking to long-standing debates. Ms Langston outlined four ways in which greater gender representation could help discussions on space security: i) increased interpersonal communications, ii) finding alternative ways to bridge differences of opinions, iii) creative thinking, and iv) collaborative thinking. Furthermore, she stressed the need to examine precisely how data is shared and disseminated, with particular attention being paid to who is receiving the data and who is making decisions based thereon.

Discussion

There was general agreement among the panellists that it was critical for data to be shared more among all stakeholders. Whether it be leadership sharing with constituents or collaborative efforts between academics, the flow of data needed to be dispersed to more people and “more types of people”. This included sharing data across national, economic and gender divides. It was felt that space-derived data was not being used sufficiently and that more efforts should be made to ensure that it ended up in the hands of more people. It might even be possible to achieve this aim through efforts within the United Nations.

Day 2: Opening Session

Keynote Address

- Ambassador Mr Guilherme de Aguiar PATRIOTA, Special Representative of Brazil to the Conference on Disarmament

Ambassador Mr Guilherme de Aguiar Patriota opened the proceedings of the second day of OS18 by acknowledging the significant steps taken within the United Nations to set up new bodies to discuss space security challenges. He noted that space applications were on the rise, with States no longer the sole actors in that environment. Today, it was more important than ever that space was used for peaceful purposes and that its finite resources were used responsibly. New opportunities meant new threats, and there were greater possibilities for competition, congestion and conflict in space. The Ambassador stated that the number one concern for the international community should be ensuring that space remained free of weapons, threats and instability.

The Ambassador wondered if space security was well served by existing international law and norms, notably as the number and type of actors was rapidly increasing. He also questioned whether the normative interests of society were being met by this framework. The Ambassador encouraged States to work together, utilising space to meet cooperative goals, such as the Sustainable Development Goals. He also noted that effective, preventative agreements were needed for cooperative solutions, and that initiatives such as the COPUOS Long-Term Sustainability Guidelines (LTS)¹⁵ or EU ICoC could provide the basis for discussions.

¹⁵ For more information, see United Nations Office for Outer Space Affairs, “Long-term Sustainability of Outer Space Activities”. Available at <http://www.unoosa.org/oosa/en/ourwork/topics/long-term-sustainability-of-outer-space-activities.html>.

Ambassador Patriota called for ideas and proposals that might serve as the basis for more discussions, encouraging Member States to keep an open mind during the next period of discussions on PAROS. He noted that the PPWT had been debated significantly but warned that it was a mistake to maintain old negotiation dynamics in future discussions. While acknowledging that there was limited possibility of the international community reaching a legally binding instrument soon, he encouraged Member States to seek a compromise that might serve as a short-term solution to existing space security challenges.

Panel 5. Emerging challenges

Chair: Mr Chris JOHNSON, Space Law Advisor, Secure World Foundation

Panellists:

- Mr Alexandre VALLET, Chief, Space Services Department, International Telecommunication Union (ITU)
 - Telecommunication Security: threats to the space segment of international telecommunication networks
- Dr Laura GREGO, Senior Scientist, Union of Concerned Scientists
 - Upgrading Strategic Missile Defense Systems: implications for tensions in the space domain
- Professor Thomas JENNEWEIN, Quantum Encryption and Science Satellite, University of Waterloo
 - Quantum Computing for Satellite Communications: a revolution for encrypted communications
- Professor Kazuto SUZUKI, Associate Professor, Hokkaido University
 - Military Outsourcing: legal and security consequences for commercial operators

The first panellist, *Mr Alexandre Vallet* started his presentation by reporting that 99.96% of global telecommunications were interference-free. For the remaining .04% of activities, they experienced two types of interference: unwanted emissions (emissions produced by a transmitter outside of designated parameters) and in-band interference (caused either by internal or external factors). Mr Vallet recalled that Article 15 of the International Telecommunication Union (ITU) Radio Regulations established a “good will” based mechanism for reporting and resolving harmful interference. He then gave four examples of real life interference. First, military radars were often masked and could create interference, but detection capabilities could find the source within a 5km radius. Secondly, interference could come from another satellite carrier. Thirdly, “piracy” was a new form of interference whereby a party took advantage of gaps within a satellite’s frequency bandwidth to secretly transmit their own data. Fourthly, intentional jamming of a satellite would prevent a carrier signal from reaching its destination.

Mr Vallet then explained the procedure by which ITU Member States could address these challenges. First, they had to locate the source of interference; this procedure could often require the cooperation of national administrations. Secondly, a complaint had to be sent to the offending State. The ITU assumed that a State could control radio communications within their territory and would be willing to cooperate. However, this did not address cases that involved intentional interference, such as piracy or jamming. For this issue, new mechanisms had to be developed.

Next, *Dr Laura Grego* discussed the close linkage between anti-ballistic missile (ABM) defence systems and ASAT technology. As a preliminary matter, Dr Grego discussed the technical aspects of ballistic missile flight, noting in particular that intercontinental ballistic missiles (ICBMs) often reach altitudes similar to satellites, while short- and medium-range missiles rarely reach those

heights. In addition to direct-ascent missile interceptors, new types of ABM technology were being developed, including lasers. Dr Grego expressed concern that discussions had also re-emerged regarding the possible placement of ABM defence systems in outer space, which, even absent any meaningful intent to follow through, could be perceived by other States as a grave threat.

Dr Grego stated that, currently, the US had the most sophisticated missile defence systems, but these were also being developed by China, the Russian Federation and India. The technologies required for these systems were also well suited to reaching satellites at lower altitudes. However, Dr Grego indicated that States had a great incentive not to use ballistic missile technology against satellites because of the resulting debris, which travelled extremely fast in orbit and could be devastating to a space object in the case of a collision. Nevertheless, Dr Grego expressed concern that more and more actors might be looking to acquire ASAT technology, particularly because there was no treaty or prohibition in place against the development or use of such capabilities. Even if ASAT technology was not the weapon of choice for conflict in space, Dr Grego warned that their existence would nevertheless influence policies and decision-making. She suggested the adoption of TCBMs as a preliminary matter, perhaps limiting the speed of interceptors in order to reduce possible threats to objects in orbit.

Professor Thomas Jennewein offered participants a brief on quantum computing for satellite communications. He explained that particle physics was inherently different from classical physics and that technology was becoming better able at taking advantage of the unique properties. The hope was that one day all telecommunication devices would be upgraded to quantum capabilities. This would be especially useful for secure communications, such as those employed in quantum key distribution. This process used the Heisenberg principle of uncertainty to ensure that a secure line of communication dissolved if a third-party was monitoring the communications.

Professor Jennewein noted that the significant advantages of quantum technology had led to the technology being commercialized. However, there were still major technological challenges that had to be resolved, such as how far communications could be sent. Importantly, several countries, including China, were conducting experiments that used a satellite as an intermediary connecting point, possibly enabling quantum communications all over the world. This technology could significantly impact current security dynamics by introducing technology that was far beyond what other parties had, namely an “un-hackable” communication link.

Finally, *Professor Kazuto Suzuki* examined current trends where the military was increasingly outsourcing services to the private sector. Traditionally, the military had led in cutting-edge space technology, but commercial services were catching up and even surpassing military capabilities. In particular, the reduced cost of access to space meant that private companies were expanding their range of services, including high-resolution remote sensing satellites and a new global positioning system exclusively for the military. Private actors even carried out top-secret operations in conjunction with the military, such as testing on the Boeing X-37B orbital test vehicle.¹⁶

Professor Suzuki pointed out that this trend would have legal implications, such as regulation of ownership, export regulations and technology transfers. The latter would be particularly challenging if private contractors had foreign partners whose involvement was limited by export regulations. There were also security considerations that had to be taken into account. On the one hand, there were strong incentives for the military to rely on commercial operators because it reduced risks to the military’s own assets. In addition, using global operators allowed military

¹⁶ For more information, see Mike Wall, “X-37B: The Air Force’s Mysterious Space Plane”, Space.com, 2 June 2017 (last updated 8 May 2018). Available at <https://www.space.com/25275-x37b-space-plane.html>.

forces to have worldwide coverage without having to deploy its own infrastructure. On the other hand, there were certain risks to which commercial operators could be exposed. Commercial operators would be increasingly responsible for sensitive information and assets, a role for which they were not yet fully equipped. Commercial actors might also become legitimate military targets, which could become a growing concern as “counterspace” technology developed and diversified. For this reason, Professor Suzuki encouraged Governments and private operators to rethink the nature of military contracts to take into account the growing risk of conflict in space.

Discussion

There were several questions about how to distinguish between commercial and military satellites. It was noted that the dual-use nature of technology and the increasingly blurred line between classifications of services made it difficult to categorize space assets. There was also doubt as to whether liability for risks incurred in some services should lie with the commercial operator or the military. Regardless, it was felt that this issue warranted further study as more and more counterspace capabilities emerged, particularly in light of ambiguities that existed in commercial insurance policies.

Panel 6. Searching for Viable Steps: gauging options big and small

Chair: Ambassador (Ret.) Mr Paul MEYER, Senior Fellow, The Simons Foundation

Panellists:

- Ms ZUO Rui, Deputy Director, Department of Arms Control, Ministry of Foreign Affairs, People’s Republic of China
 - United Nations Group of Governmental Experts on Substantial Elements of an International Legally Binding Instrument on PAROS, including, *inter alia*, on the Prevention of the Placement of Weapons in Outer Space
- Mr Andrey GREBENSCHIKOV, Ministry of Foreign Affairs, Russian Federation
 - No First Placement of Weapons in Outer Space
- Mr Daniel PORRAS, Space Security Fellow, UNIDIR
 - Anti-Satellite Test Guidelines: no debris, low debris, notification
- Dr Rajeswari Pillai RAJAGOPALAN, Senior Fellow and Head of the Nuclear and Space Policy Initiative, Observer Research Foundation
 - Shifting Alliances: evaluating the possible in today’s security environment

Ambassador Meyer opened the last panel by pointing out that the focus of this panel was to identify some of the options, whether ambitious or modest, that might have a beneficial impact on the sustainability of space activities. He also drew attention to the *Space Security Index*, a comprehensive annual survey of developments in the use of outer space relevant to space security that was supported by The Simons Foundation Canada and several universities as a resource to inform stakeholders.

Ms Zuo Rui introduced one of the latest developments in discussions on arms control in outer space: the establishment of a GGE to consider and make recommendations on substantial elements of an international legally binding instrument on PAROS, including, *inter alia*, on the prevention of the placement of weapons in outer space. This GGE was established pursuant to General Assembly resolution A/RES/72/250, sponsored by China, the Russian Federation and 33 other States. The resolution was put forward because the sponsors felt there was a growing sense of urgency around the topic of weaponization of outer space. While the CD had held extensive discussions, there was as yet no programme of work. The GGE could help broaden

consensus among Member States on this issue with a view towards commencing discussions on a legally binding instrument for PAROS.

The resolution gave the United Nations Secretary-General a mandate to establish a GGE with up to 25 members—based on geographical representation—to consider and make recommendations on elements of a legally binding instrument on PAROS. The GGE would operate on the basis of consensus, without prejudice to national positions for future negotiations. The GGE had been mandated to hold two 2-week sessions in Geneva, but it was envisaged that there would also be informal meetings.

Ms Zuo observed that the GGE should have a comprehensive understanding of the challenges and threats to outer space security. As a preliminary matter, the GGE should determine whether there is an “arms race” in outer space. She stressed that the aim of the GGE should be to arrive at a legally binding instrument on PAROS, as this is the only way to establish rights and obligations for States. While the current legal regime for outer space contains some provisions related to arms control, numerous gaps remain that can lead to the weaponization of outer space. Ms Zuo drew attention to the numerous working papers that China had submitted over the years on this subject, as well as the draft PPWT. She stressed that while TCBMs can be useful in promoting a treaty, they should not be considered a substitute for a legally binding instrument. Furthermore, unique problems such as “verification” should not be considered as a pre-condition for a treaty on PAROS. She wished the GGE all success and reaffirmed China’s commitment to the prevention of an arms race in outer space.

Next, *Mr Grebenschikov* introduced a unilateral political pledge NFP. First introduced by the Russian Federation in 2004, this pledge was a voluntary undertaking for States not to be the first to place weapons of any kind in outer space. At present, 18 States had undertaken this pledge, including Argentina, Brazil and the Russian Federation. Viet Nam and Suriname were the most recent States to take the pledge. This initiative was strongly promoted by both the Russian Federation and China, as it was in line with their objective of achieving a PPWT and, ultimately, PAROS. In addition, the Russian Federation and Brazil had, for the last four years, submitted a General Assembly resolution calling on Member States to consider taking the NFP pledge. This resolution—co-sponsored by 44 States—was adopted at the 72nd session of the General Assembly, with 131 votes in favour.

Mr Grebenschikov pointed to this overwhelming global support as evidence of the viability of the NFP initiative. Furthermore, it had been the subject of much discussion within United Nations bodies, including the First Committee and the UNDC. However, there had been some criticisms, and Mr Grebenschikov took the opportunity to respond. First, Mr Grebenschikov acknowledged the claims that NFP was a “smokescreen” designed to hide a covert Russian military space programme aimed at developing anti-satellite technology. The Russian Federation had consistently denied this and held a position in favour of PAROS. Secondly, Mr Grebenschikov also acknowledged the criticism that NFP encouraged second and third placement of weapons in outer space, and that the lack of explicit mention of WMDs meant that such weapons would be excluded from this pledge. He explained that the reason the term “first” had been used in the pledge was respect for national security policies. However, the Russian Federation would be willing to modify the language to ensure that no weapons were ever placed in outer space. Furthermore, on the criticism of WMDs, such weapons were already prohibited from being placed into orbit by the OST. Thirdly, some had said that NFP did not meet the criteria for TCBMs set forth in the 2013 report issued by the GGE on Outer Space TCBMs. In that report, it was put forward that a TCBM had to:

- “(a) Be clear, practical and proven, meaning that both the application and the efficacy of the proposed measure have been demonstrated by one or more actors;
- (b) Be able to be effectively confirmed by other parties in its application, either independently or collectively;
- (c) Reduce or even eliminate the causes of mistrust, misunderstanding and miscalculation with regard to the activities and intentions of States.”¹⁷

While these criteria were useful guidance, Mr Grebenschikov did not see them as being exhaustive. While some TCBMs might not conform perfectly to these criteria, they could still be useful in edging closer towards the ultimate objective of PAROS.

Finally, Mr Grebenschikov addressed concerns regarding definition of terms and verification. While the PPWT offered a proposed definition of “weapons in outer space”, he was not convinced that a definition was needed at all for NFP. Indeed, the term “international terrorism” had no legal definition and yet was used regularly. Likewise, the General Assembly resolution on PAROS—put forward by Egypt and Sri Lanka—also did not define “weapon” or “arms race” and yet was adopted each year by an overwhelming majority of Member States. Regarding verification, Mr Grebenschikov did not think verification would be necessary in a voluntary, non-legally binding instrument such as NFP. The consequences of breaching the political NFP pledge—namely “naming and shaming”—should be sufficient incentive to keep States in compliance. That being said, verification would be an integral part of a potential PPWT regime.

Mr Grebenschikov expressed optimism regarding support for the NFP initiative, hoping to soon include Member States from the Middle East and more Member States from South America. He expressed hope that the NFP pledge would continue to stimulate conversation among various United Nations bodies and that the UNDC Working Group II on the practical implementation of TCBMs would include NFP in its recommendations.

Next, *Mr Daniel Porras* introduced a report on possible ASAT test guidelines as TCBMs. Mr Porras acknowledged the rapidly expanding space economy and its estimated value in years to come. He also noted that militaries around the world were becoming increasingly reliant on space capabilities, and were showing greater concern for uninterrupted access to related applications. Threats such as space debris had been acknowledged as a serious problem for all and there was general agreement that efforts should be made to mitigate this challenge. To this end, Mr Porras contended that the proliferation of anti-satellite technology—particularly of the type that caused space objects to physically break up in orbit—posed a serious risk as a source of more space debris. In particular, he noted the destruction of the Chinese FengYun-1C satellite and USA-193 satellite as examples of how the destruction of a satellite could leave behind debris. The incident involving the former had been carried out at an altitude that resulted in significant long-lived debris remaining in orbit today, 11 years after the test, while the latter had been carried out at a low enough orbit that the debris de-orbited within 18 months. While neither of these operations had been carried out in aggression, the mere testing of the technology had resulted in real consequences for all the activities taking place in low Earth orbit.

Mr Porras acknowledged that while numerous efforts were ongoing within the United Nations, there were no existing rules or guidelines on the testing and development of this type of technology. However, there was a recommendation within the 2013 report of the GGE on TCBMs that spoke to this type of activity, namely the intentional break-up of space objects. Mr Porras

¹⁷ Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities, 23 July 2013 (A/68/189), para 34.

identified three principles contained in that recommendation: no debris, low debris and notification. First, intentional break-ups of objects in orbit should not create long-lived debris. Secondly, if an intentional break-up had to create debris, it should occur at a low-enough orbit that the debris would not be “long-lived”. Finally, States should issue a notification about such activities. Mr Porrás noted that while there were still political roadblocks to achieving a total ban on the placement or use of weapons in outer space, a focused measure such as this could have tangible benefits for all space actors. In particular, he noted that such an initiative would be in line with the national policies of all major spacefaring nations, namely the development of commercial and governmental activities in outer space.

Mr Porrás suggested that such a measure could be examined within the new Subsidiary Body 3 on PAROS, as well as by the UNDC Working Group II on the practical implementation of TCBMs. It could also be examined by the First Committee, though it might not be appropriate to put this topic before either the Fourth Committee or COPUOS, since those bodies traditionally focus only on “peaceful uses of outer space”. Such a proposal could also be implemented unilaterally by States who pledged to make “no debris, low debris, notification” a part of their own national policies.

Finally, *Dr Rajeswari Pillai Rajagopalan* discussed what new initiatives might be possible as strategic partnerships around the world shifted. She started by stating that she did not believe the world had breached the threshold of space “weaponization”, though there were concerns that States were approaching this point. Deterrence had worked in the past, but such an approach was increasingly ineffective in space due to the secretive nature of military space activities. She warned that a lack of transparency could lead States to misinterpret actions and potentially engage in conflict by accident. The aim of arms control measures in outer space should therefore be to reduce the possibility of such misunderstandings.

Dr Rajagopalan suggested that any of the currently proposed measures on PAROS could be possible if sufficient political will existed. In the meantime, she saw the problem of definitions as being one of the biggest challenges to multilateral dialogues. Furthermore, national security interests had driven partners further apart, making it increasingly difficult to reach consensus on any issue, no matter how reasonable. Yet the threats to stability in space were growing, so every effort should be made to address these challenges, either by a legally binding instrument or by any other TCBM. Dr Rajagopalan encouraged States to start a dialogue on any common interest, even a small one, as an effective means of building trust and launching a meaningful dialogue.

Discussion

Some wondered whether the NFP proposal and the ASAT test guidelines were compatible or could be combined into a single proposal. Whilst it was generally agreed that the two were complementary, they were also seen as addressing two distinct aspects of PAROS and should be approached as distinct tools for the time being. Others also wondered about a piecemeal approach and whether it was worth examining focused TCBMs, instead of putting all energies into adopting a legally binding instrument on PAROS. The view was held that both initiatives were steps towards the PPWT and were not mutually exclusive from work on PAROS. Some also wondered whether the suggestion for ASAT test guidelines would not be better served in COPUOS. It was generally agreed that intentional orbital breakups could be discussed in COPUOS in a peaceful context but that they would likely refrain from addressing the specific behaviour in question, namely the development of ASAT technology as weapons. In this context, the CD or the UNDC were seen as more appropriate venues for this topic.

Closing Remarks

- Ambassador (Ret.) Mr Paul MEYER, Senior Fellow, The Simons Foundation

Ambassador Meyer closed OS18 by drawing attention to what he felt were positive new developments that have taken place over the last few months on the topic of PAROS. He also warned of negative pressures such as escalating threat perceptions that drove development of counterspace capabilities, which might disrupt the current general stability enjoyed in Earth's orbits. He called this a worrisome situation and stated that one of the purposes of the annual Space Security Conference was to bring together diverse stakeholders in an effort to find workable solutions to space security challenges. Ambassador Meyer encouraged participants to increase their engagement, particularly with the private sector and civil society, in order to develop concepts of responsible behaviour in the hope of ensuring continued human enjoyment of outer space for many years to come.



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UNIDIR Space Security Conference 2018

SPACE SECURITY: THE NEXT CHAPTER

CONFERENCE REPORT

7–8 MAY 2018

For years, discussions on space, security and the next age of human exploration have revolved around the “threats of tomorrow” and “wars of the future,” yet little has been done to meet these challenges at the international level. Discussions for a new, legal instrument for arms control in outer space have moved slowly, and even “soft law” instruments have difficulty finding critical support. Conversely, space activities are only gaining momentum. The year 2018 will mark a significant year for the space environment, with private actors expected to launch the first missions of a new generation of space activities. Likewise, States are enacting laws to further spur innovation and strengthen the space economy. Such changes will drastically alter realities in space, whether or not the existing global governance structure for space activities is adequate.

In this context, the UNIDIR 2018 Space Security Conference examined the existing framework for space governance to see what aspects remain relevant to the emerging order in outer space, as well as what elements might be updated. In this way, UNIDIR and its partners, The Simons Foundation Canada and Secure World Foundation have shed light on how the international community can start a new chapter of space security dialogue.