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Reflections on the 2024 United Nations Office for Outer Space Affairs Space Law and Policy Conference

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Highlights

- **Urgent Need for International Cooperation**: The 2024 Space Law and Policy Conference highlighted the urgent need for international cooperation to address the legal and regulatory challenges posed by the rapid growth of space activities, including mega-constellations, lunar settlements, and resource extraction.
- **Balancing Innovation and Sustainability**: Discussions focused on balancing technological innovation with the sustainable use of outer space resources, emphasizing the importance of preventing an arms race and protecting the night sky for astronomical research.
- **Information Sharing as a Critical Concern**: The conference emphasized the significance of information sharing among space actors to enhance safety, prevent collisions, and mitigate the threat of space debris. Different approaches to achieving this objective were debated.
- **Call for Global and Regional Action**: The conference concluded with a call for states to sign UN space treaties, adopt national space legislation, and actively participate in international and regional cooperative efforts to ensure responsible and sustainable space activities.

The Urgent Need for Updated International Space Law

The United Nations Office for Outer Space Affairs (UNOOSA) recently organised the 2024 Space Law and Policy Conference in Vienna. Entitled "Promoting Responsible, Peaceful, and Safe Use of Outer Space and Maintaining Sustainability of Outer Space Activities," the Conference was designed to foster dialogue among 160 invited participants, including decision-makers and policymakers from national space agencies and governmental bodies, experts from the space community and academia, and private sector representatives. As I will reflect upon later, regional space agencies, apart from the European Space Agency (ESA), were notably absent. Discussions were connected by the urgent need to address emerging legal issues to preserve peace and to ensure sustainability in outer space, whilst adhering to the existing international (UN) law framework, primarily the Outer Space Treaty of 1967 (OST). As an invited expert, I was heartened to witness participants from all economic regions agree on the importance of further development of international space law to support sustainable use of outer space resources and to prevent an arms race in outer space. National, international, and civil society initiatives were showcased during the conference. However, my optimism is overshadowed by concerns about whether and how the procedural and substantive differences in prioritising various aspects of the problems and reaching an agreement on proposed solutions will be resolved in time to keep pace with this rapidly evolving domain or whether unilateral solutions will take advantage of the current vacuum.

Technological Advancements and the New Space Race

The technology underpinning recent topical developments in outer space, like mega-constellations, lunar settlements, resource extraction, and private space flights, has been available for many years. Satellite constellations refer to a group of artificial satellites working together as a coordinated system, and they have been in use since the early 1990s. The Global Positioning System (GPS), operational since 1993, is one of the most prominent constellation systems and an essential feature of daily life on Earth. Also in the early 1990s, a commercial broadband satellite internet venture, Teledesic, initially planned as an 840-satellite constellation in the Low Earth Orbit (LEO), failed for commercial reasons. In 2001, Dennis Tito, an American engineer and entrepreneur, funded his own trip to space aboard a Russian Soyuz TM-32 spacecraft. He spent six days in orbit on the International Space Station (ISS) and became the first space tourist. The United States (US) Apollo program landed humans on the Moon between 1969 and 1972. Temporary Apollo Lunar Modules are considered the first lunar habitats.

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Extracting resources from space dates to the early days of space exploration. The astronauts in the Apollo missions brought back lunar samples for scientific study. Sample return missions have since been conducted using remotely controlled space probes - unmanned spacecraft.

Over the years, more samples have been collected from the Moon, a comet, and asteroids by the US, Russian, Chinese, and Japanese missions for scientific purposes. Until recently, although technically feasible, due to the high investments required for these missions and immediate commercial and societal returns deemed limited, most space-faring nations have prioritised non-space-related investments. The concern about gaps international law and policy framework was confined to specialised groups and a few leading spacefaring nations. The growth of the commercial outer space sector and the onset of the New Space Race were driven by the interest of private actors, primarily from the US. Advances in enabling technologies, such as reusable rockets, made space exploration more cost-effective and spurred a variety of missions and experiments. The increase in space-based activities highlights the need to interpret existing international law principles within the context of each activity, bringing this issue to the forefront of the global agenda and revealing differences among major space-faring nations and other stakeholders. In this context, the UN Committee on the Peaceful Uses of Outer Space (COPUOS) and UNOOSA have been under increased pressure to promote international cooperation to address these challenges promptly.

National Initiatives and International Cooperation

This annual conference occurred at a pivotal time amid the New Space Race. It allowed participants to discuss current challenges and assess proposed future policy directions. The event commenced with insightful remarks from Aarti Holla-Maini, Director of UNOOSA, who emphasised the importance of international cooperation in space law for peaceful and sustainable use and exploration of outer space. She highlighted the pressing need for new binding and non-binding instruments and the desire for nations to reaffirm their commitment to the OST principles. Consistent with this theme, the first session featured three presentations on national initiatives dedicated to advancing space sustainability. Nayoung Youn, the Korean Aerospace Research Institute representative, introduced the Republic of Korea's (draft) Recommendations for the Development and Operation of Spacecraft for Space Debris Mitigation. Based on the UN Space Debris Mitigation Guidelines 2007, this document is a step towards the countries' aspiration to claim influence in the global space economy while raising domestic awareness of international standards. Muhammad Naveed, representing the Space Agency of Pakistan, another emerging spacefaring nation, emphasised the critical importance of Space Situational Awareness (SSA) and Space Traffic Management (STM) in global space policy. He highlighted that geopolitical tensions and varying national priorities present significant challenges. He advocated for coordinating global, regional, and national efforts, preferably under a specialised UN Body, to address regulatory fragmentation-related issues. Indeed, SSA is essential for tracking objects in orbit to prevent collisions,

while STM utilises this data to ensure the safe movement of satellites and other space assets. Consequently, these measures are vital for avoiding collisions, mitigating the threat of space debris, and enhancing operational efficiency.

The scope of contribution made by Sergey Belousko, the representative from the Russian Federation, to this session, had a broader scope. It summarised their long-standing perspective on the issues discussed and paths proposed for multilateral cooperation. He reiterated the commitment of the Russian Federation, an established space-faring nation, to multilateral cooperation. When reminding the audience of their cooperation and sustainability efforts over the years, he specified the proposal for a UN-based international data-sharing platform for space objects. The defining feature of the Russian approach was the acknowledgement of the need for new norms, preference for binding norms negotiated and agreed upon at the UNCOPUOS, and demand for adherence to Article VI of the Outer Space Treaty, which imposes international responsibility on states for public and private national activities in outer space. In this first session, moderated by Michael Newman, the legal officer of UNOOSA, the significance of information sharing and the different approaches to realising that objective emerged as critical concerns shared by emerging and established space-faring nations alike.

Challenges in Information Sharing and Transparency

The second day started with presentations on Dark and Quiet Skies initiatives aimed at reducing light pollution and radio interference to protect the night sky for astronomical research and cultural heritage. This initiative is crucial due to the increasing number of satellites and artificial lights that disrupt astronomical observations of celestial phenomena. The UN, the International Astronomical Union (IAU), and other astronomical organisations have been actively trying to address this issue. Dr. Sara Langston from Embry-Riddle Aeronautical University delivered a compelling ethical argument in favour of legal initiatives that aim to balance innovation with the preservation of dark skies. Dr. Rafia De Gama from the University of Pretoria offered a Global South perspective, highlighting the interplay between domestic developmental needs and the global demand for increased dark skies. Dr. Nur Almatin from the National Research and Innovation Agency (BRIN), Indonesia, discussed domestic dynamics, noting how the presence of Dark Skies National Park and Timau National Observatory raise public awareness of the topic, which in turn helps support domestic regulatory initiatives. Maria Valdivia Lefort of the Royal Astronomical Society, UK, advocated raising awareness among decision-makers about the impact of mega-satellite constellations on astronomy. She also provided specific technical recommendations to mitigate these impacts and suggested how they could be incorporated into international regulatory frameworks and guidelines. The moderator, Ulpine Botezatu of the Romanian Space Agency, emphasised the relevant UN initiatives and referred to the UNCOPUOS Provisional Agenda 62nd session. Despite the admirable efforts and the support these efforts receive, the challenge in protecting Dark and Quiet Skies is the difficulty in balancing competing domestic and global interests, particularly those related to the satellite constellations consisting of very large numbers, which pose significant risks to the astronomical observation.

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The following session, moderated by two COPUOS Working group chairs, Franziska Knur and Steven Freeland, was dedicated to a challenging topic: the facilitation of information sharing among space actors. According to the European Space Agency (ESA), there are over 170 million pieces of space debris in Earth's orbit that are at least 1 millimetre in size. It is accepted that for the safety of operations and planned activities it is essential to have access to information to predict occurrences which require a coordinated and collaborative approach. The session participants from the Russian Federation Space Agency (ROSCOSMOS), the European Space Agency, the China National Space Administration, the US State Department, and the Brazilian Space Agency shared their relevant perspectives and expertise. They agreed that international and domestic law improvements were urgent and necessary for orbital and lunar activities, including resource extraction. However, the differences in approach were apparent. The US representative focused on transparency and confidence-building measures and framed

his thoughts as part of the broader space governance regime. He referred to some of the prior US initiatives at the UN regarding information sharing. The Chinese representative framed his arguments with reference to OST principles, specifically Article XI, which requires states to inform the UN Secretary-General, the public and the international scientific community about the nature, conduct, locations, and results of their space activities. He emphasised that space exploration and use shall be conducted for the benefit of all countries and in a manner that fosters international collaboration. He also emphasised the due regard principle under Article IX of the OST, which requires the state parties to act with due regard to the corresponding interests of all other State Parties to the Treaty. Joanne Wheeler, a leading international space law expert, stressed the need for immediate action. She cautioned that activities in LEO could become uninsurable within the next two years, severely affecting the rapidly growing space sector. Wheeler pointed out that the dual-use challenge, the potential use of technologies for civilian and military purposes, makes the space environment less transparent. She advocated for standardised and interoperable data sharing to improve predictability and benefit the space sector. Her remarks underscored the negative consequences of delays in regulatory efforts and established the importance of transparency for the space sector, as well as for the ongoing use and sustainability of outer space. Additionally, follow-up questions from the floor, mainly from private sector representatives, offered valuable insights into the day-to-day operational impact of the discussed principles. This session was significant in bringing together representatives from prominent space actors. If the envisioned information-sharing platform were operational today, it would actively involve their relevant agencies and their private sector. Therefore, it is crucial that the proposed solution is agreeable to them.

Regional Space Agencies and Their Potential Role

With the rise of private US companies like SpaceX, commercial space sector growth has led to more frequent and diverse space missions. Technological advancements such as SpaceX's and reusable rockets revolutionised space access, significantly lowering the cost of launches and increasing satellite launches. There has been a renewed interest in lunar exploration, with multiple missions to study the Moon and prepare for future human settlements. Mars missions have also increased, with notable successes like NASA's Perseverance rover and Tianwen-1 and Zhurong China's Mars orbiter and rover. More countries are participating in space activities, leading to a greater number of international collaborations and missions.

In reflection of the increased number of space actors, the last day of the conference was dedicated to discussing new laws and policy initiatives, the motivations and experiences of nations that have recently enacted national space legislation, and the legal and regulatory implications of new activities. Among the highlights were presentations by experts, including Ryan Shaughnessy of the World Intellectual Property Organization, who raised the issue of the applicability of intellectual property law, which is based on the territoriality principle, in outer space. Jean Francois Mayence of the Belgian Federal Office for Science Policy introduced the political and legal implications of Ecocide Crime as recognised in Belgian criminal law. US lawyer Neha S. Dagley discussed the need for a more predictable legal environment for the emerging private human spaceflight sector. Vinicius Aloia of Astroscale presented the regulatory obstacles faced by his company, primarily their Rendezvous and Proximity Operations (RPO) missions. Astroscale provides on-orbit servicing solutions, which include life extension and active debris removal. Drawing attention to the significance of these operations for space sustainability, he called for a harmonised international approach to the legal requirements of RPO missions and a harmonised implementation of national legal and regulatory frameworks to support their safety, sustainability, and commercial viability.

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The conference was finalised with a call for states to sign the UN space treaties by Kai-Uwe Schrogl, International Institute of Space Law and ESA, adopt policies and implement national space legislation. The Legal Advisory Service of UNOOSA was introduced, with presenters from emerging space nations such as Paraguay, Bhutan, Kenya, Uruguay, and Namibia, as well as the more established space actor India, sharing their experiences in developing domestic legislative processes.

Final Thoughts

In light of the surge in space activities, there is a shared global understanding of the need for new regulations. National and regional initiatives are on the rise, yet the newly established regional space agencies were notably absent from this meeting. In response to my informal inquiries, numerous participants have commented that these agencies have yet to produce concrete shared policies. UNOOSA's long-standing capacity-building workshops and conferences on space law and policy play a crucial role in fostering essential stakeholder dialogue and cooperation in space governance. The Asia-Pacific Space Cooperation Organization (APSCO), established in 2008; the Asia-Pacific Regional Space Agency Forum (APRSAF), established in 1993; the African Space Agency (AFSA), established in 2023; and the Latin American and Caribbean Space Agency (ALCE), established in 2020, can each play a more active role. In addition to supporting space law, policy, and commercial development in member countries, they can promote their shared goals, akin to ESA. They can engage in and benefit from inter-regional space policy dialogues to build capacity and align shared objectives. Considering the success of binding and non-binding outer space law instruments agreed upon under the auspices of the UN, it is evident that critical decisions emerge from the work of COPUOS, supported by UNOOSA processes. Regional organisations can leverage the recently heightened domestic interest in outer space and offer significant advantages by facilitating the regional exchange of know-how, enhancing capabilities, and pooling otherwise limited domestic resources for outer space-related projects. In addition, they can increase global awareness of regional socio-economic, scientific, and security challenges and promote their views on emerging topics by participating in multilateral discussions, notably within the UN.

EDITORIAL INFORMATION

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