

15 April 2024

English only

---

**Committee on the Peaceful****Uses of Outer Space****Legal Subcommittee****Sixty-third session**

Vienna, 15–26 April 2024

Item 9 of the provisional agenda\*

**General exchange of views on potential legal models  
for activities in the exploration, exploitation and  
utilization of space resources****Summary of the Expert meeting collecting preliminary  
inputs for consideration at the international conference in  
Vienna in 2024****(Luxembourg, 26 March 2024)****I. Introduction**

1. At the sixty-first session of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, in March 2022, the Working Group on Legal Aspects of Space Resource Activities agreed on its five-year workplan and methods of work (A/AC.105/1260, annex II, para. 6 and appendix). The workplan included the convening, in 2024, of a dedicated international conference under the auspices of the United Nations, in accordance with the terms of reference of the Working Group (A/76/20, annex III), with the scope and topics to be addressed at the conference to be more fully elaborated through inputs of States, preferably in conjunction with the sixty-third session of the Legal Subcommittee, and open to Governments, invited academic and other stakeholders.
2. At the sixty-sixth session of the Committee, in June 2023, the Working Group agreed that the international conference would be conducted in an inclusive and transparent manner, within the scope and on the basis of the following topics:
  - (a) Implications of the legal framework for space resource activities;
  - (b) The role of information-sharing in supporting space resource activities;
  - (c) The scope of future space resource activities;
  - (d) Environmental and socioeconomic aspects of space resource activities;
  - (e) International cooperation in scientific research and technological development for space resource activities (A/78/20, para. 234).

---

\* A/AC.105/C.2/L.326.



3. Also at that session, the Working Group had agreed that an event would be held in Luxembourg during the Space Resources Week entitled “Expert meeting collecting preliminary inputs for consideration at the international conference in Vienna in 2024”, which would be co-hosted by Belgium and Luxembourg and organized in cooperation with the United Nations (A/78/20, para. 232).

4. The Working Group had also agreed, on an exceptional basis, to the organization of an event, under the auspices of a working group, outside the established headquarters, to be held in Luxembourg, that it would not constitute a precedent and that the host country would seek to conclude an agreement to ensure the participation of all member States.

5. The event entitled “Expert meeting collecting preliminary inputs for consideration at the international conference in Vienna in 2024” was co-hosted by Belgium and Luxembourg and organized in cooperation with the United Nations on 26 March 2024 at the European Convention Center in Luxembourg.

6. The Expert meeting was held during the sixth edition of Space Resources Week, a 3-day hybrid conference taking place from 25 to 27 March 2024.

7. The present summary was prepared by Andrzej Misztal (Poland), Chair and Steven Freeland (Australia), Vice-Chair of the Working Group on Legal Aspects of Space Resource Activities, with the support of the secretariat, and describes the background and objectives, programme and participation of the Expert meeting.

## **A. Background and objectives**

8. The Expert meeting aimed to gather preliminary inputs on the scope of future space resource activities; environmental and socioeconomic aspects of space resource activities; and international cooperation in scientific research and technological development for space resource activities.

## **B. Programme**

9. At the sixty-sixth session of the Committee, the Working Group had agreed that the presenters of the Expert meeting would be nominated by their respective national delegations and that the list of speakers would be, through close consultations between the Chair and Vice-Chair of the Working Group and States members of the Committee, prepared and finalized (A/78/20, para. 233).

10. Through the invitation circular OOSA/2023/42–CU 2023/212 of 28 June 2023, the Chair and Vice-Chair of the Working Group invited States members of the Committee to nominate speakers and presenters to both the Expert meeting in Luxembourg in 2024, and the international conference on space resources to take place within the sixty-third session of the Legal Subcommittee. In that circular, the Chair and Vice-Chair highly encouraged nominations of presenters from developing and emerging spacefaring countries for both the Expert meeting in Luxembourg and the international conference in Vienna.

11. The Chair and Vice Chair convened four intersessional meetings of the Working Group on Legal Aspects of Space Resource Activities to engage in consultations on the nominations of member States for presenters for both the Expert meeting in Luxembourg and the international conference in Vienna in 2024, as well as to discuss other practical and organizational matters relating to those events.

12. The intersessional meetings were held in virtual mode on 18 October 2023 (OOSA/2023/56–CU 2023/323 of 28 September 2023), on 22 November 2023 (OOSA/2023/61–CU 2023/372 of 8 November 2023), on 19 December 2023 (OOSA/2023/65–CU 2023/398 of 28 November 2023), and on 22 January 2024 (OOSA/2023/68–CU 2023/423 of 19 December 2023).

13. The Expert meeting's programme was prepared and finalized through the series of the intersessional meetings of the Working Group, based on nominations received from Working Group members, with the aim of incorporating diverse views and taking into account gender and geographic balance among panellists.

14. The agreed programme of the Expert meeting included 29 panellists from 18 countries, namely: Argentina, Belgium, Brazil, Canada, China, Ecuador, Egypt, France, Germany, Indonesia, Italy, Japan, Luxembourg, Mexico, Norway, Poland, Thailand, and the United States of America.

15. It was additionally decided that the Expert meeting would comprise of six moderated panels, each featuring five panellists. During those sessions, panellists would respond to pre-arranged questions posed by the moderator and address questions from the audience. Priority for posing questions would be granted to States members of the Committee. Additionally, panellists would have the opportunity to deliver closing remarks.

16. The programme of the Expert meeting was made available on the website of the Office for Outer Space Affairs of the Secretariat ([www.unoosa.org](http://www.unoosa.org)).

### C. Participation

17. Registration information for the Expert meeting was communicated to Permanent Missions to the United Nations in New York and Vienna and organizations with permanent observer status with the Committee in information circulars OOSA/2024/6–CU 2024/52 of 14 February 2024 and OOSA/2024/15–CU 2024/77 of 13 March 2024. In-person participation in the Expert meeting was open to all registered delegates.

18. The Expert meeting was publicly webcast through a dedicated website established for the event by the co-hosts.

19. The views expressed during, and in support of, the Expert meeting were those of the panellists and other participants and contributors and were not the formal positions of States.

### D. Attendance

20. More than 170 representatives registered to attend the Expert meeting. The expert meeting brought together experts from governmental institutions, such as national space agencies and ministries, and representatives of the private sector, civil society, universities, research institutions and international organizations.

21. Representatives from the following 38 countries participated in the Expert meeting: Algeria, Argentina, Australia, Austria, Burkina Faso, Bahrain, Belgium, Brazil, Canada, China, Colombia, Czechia, Ecuador, Egypt, El Salvador, Germany, Greece, Hungary, India, Indonesia, Italy, Japan, Malaysia, Mexico, Norway, Panama, Pakistan, Poland, Republic of Korea, Russian Federation, Spain, Switzerland, Thailand, Türkiye, Uganda, United Kingdom of Great Britain and Northern Ireland, United States and Zambia.

## II. Summary of the discussions

22. The Expert meeting focused on three out of five topics agreed by the Working Group. It comprised of six panels, with two panels dedicated to each of the three topics, as follows:

(a) Panel 1: The scope of future space resource activities (first part);

(b) Panel 2: Environmental and socioeconomic aspects of space resource activities (first part);

- (c) Panel 3: International cooperation in scientific research and technological development of space resource activities (first part);
- (d) Panel 4: The scope of future space resource activities (second part);
- (e) Panel 5: Environmental and socioeconomic aspects of space resource activities (second part);
- (f) Panel 6: International cooperation in scientific research and technological development of space resource activities (second part).

23. The Expert meeting was opened with welcome remarks by Jean Olinger, General Secretary, Ministry of Foreign and European Affairs, Defence, Development Cooperation and Foreign Trade of Luxembourg, by Thomas Dermine, Secretary of State for Economic Recovery and Strategic Investments, in charge of Science Policy of Belgium, and by Steven Freeland, Vice-Chair of the Working Group on Legal Aspects of Space Resource Activities of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space.

24. The keynote speech was delivered by Aarti Holla-Maini, Director of the United Nations Office for Outer Space Affairs. In her address, the Director emphasized the pivotal role of the Office in fostering international cooperation in the exploration and peaceful utilization of outer space, particularly concerning space resources. She underscored the importance of engaging in dialogue among all stakeholders and highlighted the United Nations Space Bridge's role in facilitating such discussions.

## **A. The scope of future space resource activities**

25. The first and fourth panels were moderated by Mahulena Hofmann, holder of the SES Chair in Space, SatCom and Media Law at the University of Luxembourg. The panels focused on the scope of future space resource activities.

26. The panellists of the first panel included Ernest Tan, member of the Space Exploration Strategic Planning team at the Canadian Space Agency (Canada); Liu Jizhong, Chief Designer of China's Planetary Exploration Project Tianwen-3 Mission, Lunar Exploration and Space Program Center, China National Space Administration (China); Alexis Paillet, Project manager – Chief of Moon & Mars Station, Center National d'Etudes Spatiales (CNES) (France); Philipp Reiss, Professor for Lunar and Planetary Exploration Technologies at the Technical University of Munich, Germany (Germany); and Bernhard Hufenbach, Commercialisation and Innovation Team Leader, European Space Agency (Luxembourg).

27. The panellists of the fourth panel were Arvid Bertheau Johannessen, Lead, Human Spaceflight and Exploration, Norwegian Space Agency (Norway); Kevin Cannon, Assistant Professor, Colorado School of Mines (United States); Kota Tanabe, Director, Space Exploration System Technology Unit, JAXA Space Exploration Center (JSEC) (Japan); Marilena Amoroso, Head of the Infrastructure Office of the Robotic Exploration Unit, Italian Space Agency (ASI) (Italy); and Ayman Mahmoud Mohamed Ahmed, General Manager of the Space Imaging Department, Egyptian Space Agency (Egypt).

28. The moderator posed the following questions to the panellists:

(a) Canada is one of the first countries to sign the Artemis Accords and perform activities in the space resources area. What is your perspective on the further developments in this area?

(b) Space resources activities are an important part of China's International Lunar Research Station programme. What do you consider to be the most significant steps in its implementation?

(c) In the long perspective, one speaks about using lunar water for space flights. Are the recent results of investigating the lunar water cycle promising?

(d) ESA is conducting multiple activities related to resource exploration and exploitation. Which position plays the role of in-situ resource utilization from a long-term perspective?

(e) Norway is a country rich in mineral resources; is the use of space resources of interest for the country's space programme in the future?

(f) How are you planning to further develop the technology for the characterization of mineral and chemical composition of planetary surfaces?

(g) How are lunar exploration, including space resources activities, organized in Japan, and what are the difficulties in organizing space resources activities?

(h) How can CubeSats such as LICIAC contribute to obtaining discoveries about the asteroid system?

(i) How can remote sensing technology contribute to the information about the composition of celestial bodies?

29. The discussion on space resources emphasized their critical role in sustainable and long-term space exploration. Participants discussed the need for clear guidelines on using space resources to create new knowledge and experiences that benefit society on Earth; highlighted global collaborative models facilitated by the exchange of achievements and joint planning, design, and implementation efforts. Panellists also stressed the importance of space resources for deep space exploration and the necessity of developing technology and legal frameworks concurrently to ensure both are aligned and facilitate safe, sustainable operations. Speakers also called for a thorough assessment of space resources and the lunar environment before establishing regulations, to better understand the impacts of human activities in space. Overall, the speakers discussed the need for proactive multilateral coordination to support sustainable development both in space and on Earth.

30. Panellists also discussed the potential of space resources for accelerating space exploration and fostering a space economy, emphasizing the importance of regulatory frameworks and best practices to ensure fair and sustainable space activities. They emphasized the need for proactive governance. However, the panel also acknowledged the challenges of economic viability and technology limitations in space resource extraction, suggesting a cautious approach. Participants heard about initiatives focused on lunar exploration and resource identification, leveraging successful missions to advance future space activities. Additionally, they highlighted the role of cubesats and remote sensing technology in prospecting celestial bodies for resource potential, underscoring the importance of international collaboration and capacity-building for developing countries in space exploration endeavours. Overall, the panellists emphasized the need for collaborative efforts, regulatory frameworks, and technological innovations to unlock the potential of space resources for scientific exploration and economic development.

## **B. Environmental and socioeconomic aspects of space resource activities**

31. The second and fifth panels, moderated by the Director of the Office for Outer Space Affairs, addressed the environmental and socioeconomic aspects of space resource activities.

32. The panellists of the second panel were Jean Robert Batana Pires Ferreira, General Coordinator of Strategic Technologies, Ministry of Science, Technology and Innovation (Brazil); Du Hui, Research Fellow, China Academy of Space Technology (China); Mr Mardianis, Senior Researcher, Directorate of Research and Innovation Policy Formulation, National Research and Innovation Agency (BRIN) (Indonesia); Kathryn Hadler, Director of the European Space Resources Innovation Centre (ESRIC), Luxembourg Institute of Science and Technology (Luxembourg); Vlada Stamenković, Senior Director Space Resources Program, Blue Origin (United States).

33. The panellists of the fifth panel included Philip de Man, Research Manager, Leuven Centre for Global Governance Studies (Belgium); Laércio Massaru Namikawa, Senior Technologist, National Institute for Space Research (INPE), (Brazil); Thao Nguyen, Director of Mission Engineering, Off-Planet Systems, ICON Technology Inc., (United States); Simone Pirrotta, Head of Robotic Exploration Office – Programs Directorate, Italian Space Agency (ASI) (Italy); Jesús Roberto Romero Ruíz, Deputy Director of Space Security, Mexican Space Agency (Mexico).

34. The moderator posed the following questions to the panellists:

(a) Article I of the Outer Space Treaty mentions that “the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.” In this regard, how do you ensure the socioeconomic benefits of space resources to the developing countries that may join later in space resource activities?

(b) Without agreed international principles on activities in the exploration, exploitation and utilization of space resources these economic incentives, carry a potential risk of conflict, environmental degradation, and cultural loss. In this regard what do you think are the advantages of discussing this topic under the intergovernmental framework of the Committee on the Peaceful Uses of Outer Space? How can the Office for Outer Space Affairs support in this discussion?

35. Panellists observed that developing technologies for sustainable space exploration not only enabled living and working in space but also fostered benefits for Earth by reducing costs, creating clean energy solutions, and promoting global access to space resources, thus driving equity and sustainability initiatives worldwide. Applying the joint principles of universal service obligation, emphasizing factors like availability, affordability, and accessibility, should guide the exploration and exploitation of space resources, considering the economic, environmental, and equitable implications. Speakers encouraged developing countries to pursue and participate in space programmes and to promote benefit-sharing. They highlighted the need to rethink resource utilization in space, considering complex systems, scale of operations, and potential economic benefits, while also emphasizing the importance of minimizing environmental impact and facilitating technology transfer to benefit Earth. Participants advocated for a cautious and exploratory approach to mitigate environmental impacts while advancing space resource utilization, suggesting that the Working Group on Legal Aspects of Space Resource Activities was the platform to address these complex issues.

36. Panellists also explored the multifaceted aspects of space resources, considering legal frameworks, private sector involvement, knowledge-sharing, and international cooperation. Discussions centred on the interpretation and application of the Outer Space Treaty (OST) and the need for inclusive regulations to guide space resource utilization. The panel highlighted the importance of equitable access to space resources, emphasizing the potential benefits for both scientific research and economic development. Private sector engagement was identified as a driving force for advancing space resource activities, with suggestions for promoting knowledge sharing and collaboration among businesses. Additionally, panellists emphasized the significance of expanding the definition of benefits beyond material gains to include opportunities for emerging countries and broader scientific advancement. International cooperation and capacity-building initiatives were recognized as essential for ensuring inclusive participation in space exploration and resource utilization efforts. Overall, the panel underscored the need for a collaborative and comprehensive approach to address the complex challenges and opportunities associated with space resources.

### C. International cooperation in scientific research and technological development of space resource activities

37. The third and sixth panel focused on international cooperation in scientific research and technological development of space resource activities. The panel was moderated by Jean François Mayence, Legal Advisor, Belgian Federal Office for Science Policy.

38. The panellists in the third panel were Carolina Eugenia Catani, in charge of space law affairs, National Space Agency of Argentina (Argentina); Petra Rettberg, Head of the research group “Astrobiology”, German Aerospace Center (DLR) (Germany); Setsuko Aoki, Professor of Law, Keio University (Japan); Jeremiasz Merkel, Specialist, Research and Innovation, Polish Space Agency (Poland).

39. The panellists in the sixth panel were Thales Sehn Körting, Researcher, National Institute for Space Research (INPE), (Brazil); Guo Linli Vice chief engineer, China Academy of Space Technology (China); Julien-Alexandre Lamamy, CEO, ispace Europe S.A., (Luxembourg); Kesniel Humberto Bravo Carpio (Mexico); Wilawan Pipatjirattikal, Senior Specialist Strategist, Geo-Informatics and Space Technology Development Agency (GISTDA), (Thailand).

40. The moderator posed the following questions to the panellists:

(a) Science has often been a common language, transcending competition, rivalry or even adversity between nations. Considering the very high challenges that the exploration of the Moon and the use of its natural resources represent, how do you see the value of scientific cooperation among States involved in this new endeavour? Also, do you see a potential continuity between scientific and technical cooperation and operational cooperation on the Moon? Could the active involvement of private entities in this new endeavour be a factor of development of international cooperation beyond intergovernmental relations?

(b) How do you see the role of international scientific and technological cooperation in achieving a safe, peaceful, equitable and sustainable use of space resources? Should there be a specific access regime with regard to scientific and technological results from lunar exploration, possibly based on international law provisions, such as Article III of the 1959 Antarctic Treaty?

41. Panellists discussed the importance of cooperation in science and space exploration, emphasizing the need for multilateral inclusion and collaboration among states. They highlighted the significance of adhering to international principles, such as those outlined in the Outer Space Treaty, to ensure responsible exploration and exploitation of space resources while minimizing environmental impacts. Moreover, they stressed the need for forward and backward planetary protection measures to safeguard against contamination and preserve celestial bodies' integrity. The panel also addressed the challenge of accessing scientific data and the development of beneficial and acceptable rules for all stakeholders. Additionally, they underscored the role of education, public communication, and international cooperation in addressing global challenges and advancing space exploration efforts. Finally, the panel emphasized the importance of shared values and the prioritization of cooperation to overcome challenges and achieve sustainable space exploration goals.

42. Panellists also highlighted international collaboration, acknowledging the vital role of private entities in advancing lunar exploration and exploitation. They observed that challenges like financial constraints and technological complexities have historically hindered progress, but commercial entities are now driving accessibility to the Moon. It was noted that collaboration frameworks showcased the potential for scientific advancement, and that developing countries aspired to leverage space technology for sustainable development, emphasizing the importance of international cooperation and operational coordination in space endeavours. Despite obstacles like data-sharing policies and technological standards, collective commitment to peaceful space exploration remains paramount.

### III. Closing remarks and observations

43. The information shared by Expert meeting panellists promoted information exchange, supported transparency and capacity-building. The Expert meeting additionally represented an opportunity for attendees from academia, industry and the private sector to share their unique perspectives, practices, experiences and knowledge with the Working Group.

44. In his closing remarks, the Vice-Chair of the Working Group summarized that the meeting addressed the complexity of space resource activities and the necessity for collaborative systems, and the key takeaways included the importance of cooperation, collaboration, and coordination; the role of multilateral processes; the significance of information sharing; considering all stakeholders' interests; the relevance of data handling; environmental and socioeconomic aspects; ethics and benefit-sharing; the interaction between private and public sectors; and the existing legal framework's centrality. He recalled and concluded that the Expert meeting aimed to provide preliminary input for an international conference in Vienna in 2024.

---