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**Committee on the Peaceful
Uses of Outer Space
Scientific and Technical Subcommittee
Fifty-ninth session
Vienna, 7–18 February 2022**

Draft report

I. Introduction

1. The Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space held its fifty-ninth session at the United Nations Office at Vienna from 7 to 18 February 2022, in a hybrid format (in person and online), with Juan Francisco Facetti (Paraguay) as Chair.
2. The Subcommittee held [...] meetings.

A. Attendance

3. Representatives of the following [...] States members of the Committee attended the session: Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belarus, Belgium, Bolivia (Plurinational State of), Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Cuba, Cyprus, Czechia, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Finland, France, Germany, Ghana, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Japan, Jordan, Kenya, Lebanon, Luxembourg, Malaysia, Mexico, Mongolia, Morocco, Netherlands, New Zealand, Nicaragua, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sudan, Sweden, Switzerland, Syrian Arab Republic, Thailand, Tunisia, Turkey, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay and Venezuela (Bolivarian Republic of).
4. At its 955th meeting, on 7 February, the Subcommittee decided to admit Guatemala and Uzbekistan as observers, at their request, to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.
5. Also at its 955th meeting, the Subcommittee decided to admit the Sovereign Order of Malta as an observer, at its request, to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.



6. At its 958th meeting, on 8 February, the Subcommittee decided to admit the League of Arab States as an observer, at its request, to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.
7. Representatives of the Food and Agriculture Organization of the United Nations, the International Atomic Energy Agency, the International Civil Aviation Organization, the International Telecommunication Union (ITU), the United Nations Environment Programme and the World Meteorological Organization (WMO) attended the session as observers.
8. The session was attended by representatives of the European Union, in its capacity as permanent observer of the Committee and in accordance with General Assembly resolutions [65/276](#) and [73/91](#).
9. The session was attended by representatives of the following intergovernmental organizations having permanent observer status with the Committee: Asia-Pacific Space Cooperation Organization (APSCO), European Southern Observatory (ESO), European Space Agency (ESA), European Telecommunications Satellite Organization, Inter-Islamic Network on Space Sciences and Technology, International Organization of Space Communications (Intersputnik) and Square Kilometre Array Observatory.
10. The session was attended by representatives of the International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG), in their capacity as observers, in accordance with the agreement of the Subcommittee at its fifty-third session ([A/AC.105/1109](#), para. 182).
11. The session was attended by representatives of the following non-governmental organizations having permanent observer status with the Committee: CANEUS International, Committee on Space Research (COSPAR), European Space Policy Institute, For All Moonkind, International Association for the Advancement of Space Safety (IAASS), International Astronautical Federation (IAF), International Astronomical Union (IAU), International Law Association, International Organization for Standardization (ISO), International Society for Photogrammetry and Remote Sensing (ISPRS), International Space University (ISU), Moon Village Association, National Space Society (NSS), Open Lunar Foundation, Prince Sultan Bin Abdulaziz International Prize for Water (PSIPW), Secure World Foundation (SWF), Space Generation Advisory Council (SGAC), University Space Engineering Consortium-Global (UNISEC-Global) and World Space Week Association (WSWA).
12. At its 955th meeting, the Subcommittee decided to admit the Access Space Alliance, the Association for the Development of the Atlantic International Research Centre and The Hague Institute for Global Justice as observers, at their request, to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.
13. A list of the representatives of States, United Nations entities and other international organizations attending the session is contained in document [A/AC.105/C.1/2022/INF/\[...\]](#).
14. The Subcommittee was informed by the Secretariat of the applications for membership in the Committee submitted by Guatemala ([A/AC.105/C.1/2022/CRP.3](#)) and Uzbekistan ([A/AC.105/C.1/2022/CRP.4](#)), which were to be considered by the Committee at its sixty-fifth session, in 2022.
15. The Subcommittee was also informed by the Secretariat of the applications for permanent observer status with the Committee submitted by the Association for the Development of the Atlantic International Research Centre ([A/AC.105/C.1/2022/CRP.5](#)), The Hague Institute for Global Justice ([A/AC.105/C.1/2022/CRP.6](#)) and the Access Space Alliance

(A/AC.105/C.1/2022/CRP.8), which were to be considered by the Committee at its sixty-fifth session, in 2022.

B. Adoption of the agenda

16. At its 955th meeting, the Subcommittee agreed to include an item entitled “General exchange of views on dark and quiet skies for science and society” as a single issue/item for discussion on the agenda of its fifty-ninth session. In doing so, the Subcommittee recalled that the Committee, in its report on its sixty-fourth session, in 2021, had noted that an agreement on how to procedurally address the matter could possibly be reached in the intersessional period before the fifty-ninth session of the Subcommittee (A/76/20, para. 299). The Subcommittee also recalled that, in response to the information circular sent to States members of the Committee by the Office for Outer Space Affairs on 14 January 2022, no objections or comments had been received from States members of the Committee with respect to the proposed procedure. The Subcommittee also agreed that items 18 and 19 in the annotated provisional agenda of the fifty-ninth session of the Scientific and Technical Subcommittee (A/AC.105/C.1/L.392) were to be renumbered 19 and 20.

17. At its 955th meeting, the Subcommittee adopted the following agenda:

1. Adoption of the agenda.
2. Election of the Chair.
3. Statement by the Chair.
4. General exchange of views and introduction of reports submitted on national activities.
5. United Nations Programme on Space Applications.
6. Space technology for sustainable socioeconomic development.
7. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth’s environment.
8. Space debris.
9. Space-system-based disaster management support.
10. Recent developments in global navigation satellite systems.
11. Space weather.
12. Near-Earth objects.
13. Long-term sustainability of outer space activities.
14. Future role and method of work of the Committee.
15. Use of nuclear power sources in outer space.
16. Space and global health.
17. Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including in the field of space communications, as well as other questions relating to developments in space communications, taking particular account of the needs and interests of developing countries, without prejudice to the role of the International Telecommunication Union.
18. General exchange of views on dark and quiet skies for science and society.
19. Draft provisional agenda for the sixtieth session of the Scientific and Technical Subcommittee.
20. Report to the Committee on the Peaceful Uses of Outer Space.

C. Election of the Chair

18. At its 955th meeting, the Subcommittee elected Juan Francisco Facetti (Paraguay) as its Chair for the period 2022–2023, pursuant to General Assembly resolution [76/76](#).

D. General statements

[To be inserted]

E. National reports

19. The Subcommittee took note with appreciation of the reports by Member States (see [A/AC.105/1248](#) and [A/AC.105/1248/Add.1](#)) and of the conference room paper (A/AC.105/C.1/2022/CRP.7) submitted for its consideration under agenda item 4, entitled “General exchange of views and introduction of reports submitted on national activities”. The Subcommittee recommended that the Secretariat continue to invite Member States to submit annual reports on their space activities.

F. Symposium

20. In accordance with the agreement reached by the Subcommittee at its forty-fourth session, in 2007 ([A/AC.105/890](#), annex I, para. 24), and as agreed by the Subcommittee at its fifty-eighth session, in 2021 ([A/AC.105/1240](#), para. 274) and by the Committee at its sixty-fourth session, in 2021 ([A/76/20](#), para. 148), the industry symposium organized by the Office for Outer Space Affairs on the topic of dark and quiet skies was held on 15 February 2022.

21. The symposium was opened by Simonetta Di Pippo, Director of the Office for Outer Space Affairs, and was moderated by Nathalie Ricard of the Office for Outer Space Affairs. The symposium comprised three segments.

22. The first segment, on recommendations from the United Nations/Spain/International Astronomical Union Conference on Dark and Quiet Skies for Science and Society, included the following speakers: Richard Green, University of Arizona; Casiana Muñoz-Tuñón, Instituto de Astrofísica de Canarias; Federico di Vruno, Square Kilometre Array Observatory; Constance Walker, International Astronomical Union; and Andrew Williams, European Southern Observatory.

23. The second segment, on perspectives from industry and space agencies, included the following speakers: Aarti Holla-Maini, Secretary General of the Global Satellite Operators Association; Chris Hofer, Chair of the industry perspective subgroup of the satellite constellation working group, part of the scientific organizing committee of the United Nations/Spain/International Astronomical Union Conference on Dark and Quiet Skies for Science and Society; and [...], China National Space Administration (CNSA).

24. The third segment was a question-and-answer session co-moderated by Niklas Hedman and Nathalie Ricard of the Office for Outer Space Affairs and included the following speakers: Piero Benvenuti, Director of the International Astronomical Union Centre for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference; Aarti Holla-Maini; and Chris Hofer.

25. The Subcommittee noted with satisfaction that the symposium had contributed to the work of the Subcommittee and to raising awareness of issues concerning inclusiveness in space activities.

G. Adoption of the report of the Scientific and Technical Subcommittee

26. After considering the items before it, the Subcommittee, at its [...] meeting, on [...] February 2022, adopted its report to the Committee on the Peaceful Uses of Outer Space, containing its views and recommendations, as set out in the paragraphs below.

VIII. Space weather

27. In accordance with General Assembly resolution 76/76, the Scientific and Technical Subcommittee considered agenda item 11, entitled “Space weather”.

28. The representatives of Canada, France, Germany, India, Indonesia, Iran (Islamic Republic of), Japan, Mexico, the Russian Federation, South Africa, Thailand and the United States made statements under agenda item 11. The observers for COSPAR and WMO also made statements under the item. A statement was also made by the Rapporteur of the Expert Group on Space Weather. During the general exchange of views, statements relating to the item were made by representatives of other member States.

29. The Subcommittee had before it a document entitled “Draft final report of the Expert Group on Space Weather: towards improved international coordination for space weather services”, submitted by the Rapporteur of the Expert Group on Space Weather (A/AC.105/C.1/L.401).

30. The Subcommittee heard the following scientific and technical presentations:

- (a) “Space weather activities in Slovakia”, by the representative of Slovakia;
- (b) “India’s first solar mission: Aditya-L1”, by the representative of India;
- (c) “Update of Japanese space weather research and operation”, by the representative of Japan;
- (d) “Space weather impact on spacecraft and the upcoming twenty-fifth solar cycle”, by the representative of China.

31. The Subcommittee noted that space weather, caused by solar variability, was an international concern, owing to its potential threat to space systems, human space flight and the ground- and space-based infrastructure upon which society increasingly relied. As such, it needed to be addressed in a global manner, through international cooperation and coordination, in order to be able to predict potentially severe space weather events and mitigate their impact and to guarantee the long-term sustainability of outer space activities.

32. The Subcommittee noted a number of national and international activities undertaken in space weather research, training and education to improve scientific and technical understanding of adverse space weather effects, with the aim of strengthening space weather resilience.

33. The Subcommittee also noted the importance of the work of WMO, including the development of its technical and regulatory framework for space weather and the opportunities offered by its Integrated Global Observing System and related systems, as well as the importance of the engagement of Member States with COSPAR in developing international space weather action teams for scientific research in support of transitional efforts related to research for operations, and their engagement in the space weather-related work of ITU and the International Space Environment Service.

34. Some delegations expressed the view that activities related to space weather could have an impact on aviation and, in particular, could potentially interrupt high-frequency communications and satellite navigation. In that regard, the Subcommittee noted the importance of the International Civil Aviation Organization’s four global space weather information centres, tasked with providing the civil aviation

sector with information about space weather that could potentially affect communications, navigation and the health of passengers and crew.

35. Some delegations underlined the importance of implementing the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space, in particular guidelines B.6 and B.7, which addressed the safety of space operations.

36. The Subcommittee expressed its appreciation for the completion of the survey on space weather and the development of recommendations by the Expert Group to help ensure the implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities.

37. Some delegations expressed the view that it was of value to continue the exchange of views among international experts.

[The report of the Expert Group is to be inserted.]

XII. Use of nuclear power sources in outer space

38. In accordance with General Assembly resolution [76/76](#), the Scientific and Technical Subcommittee considered agenda item 15, entitled “Use of nuclear power sources in outer space”.

39. The representatives of China, Cuba, Indonesia, Mexico, the Russian Federation, the United Kingdom, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 15. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

40. The Subcommittee welcomed the fact that some States and an international intergovernmental organization were developing, or considering developing, legal and regulatory instruments on the safe use of nuclear power sources in outer space, taking into account the content and requirements of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space and of the Safety Framework for Nuclear Power Source Applications in Outer Space, which was developed jointly by the Subcommittee and the International Atomic Energy Agency.

41. The view was expressed that the Principles and the Safety Framework provided a comprehensive foundation for supporting the safe use of nuclear power sources in outer space, and that the guidance provided in the Safety Framework enabled new approaches to safety based on continuing advances in knowledge and practice since the adoption of the Principles. The delegation expressing that view was also of the view that the practical application of the Safety Framework satisfied the safety intent of the Principles and therefore provided sufficient guidance to States and international intergovernmental organizations.

42. The view was expressed that the use of nuclear power sources in outer space should continue to be a topic of the highest priority for the Committee on the Peaceful Uses of Outer Space, as well as of both of its subcommittees, the Scientific and Technical Subcommittee and the Legal Subcommittee, with a view to maintaining constant assessment, in a multilateral framework, of existing safety regulations on that subject. The delegation expressing that view reaffirmed the importance of strict compliance with the Principles, adopted by consensus by the General Assembly in its resolution [47/68](#), and recalled that the first of the 11 principles stated that “activities involving the use of nuclear power sources in outer space shall be carried out in accordance with international law, including in particular the Charter of the United Nations and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies”.

43. The view was expressed that the use of nuclear power sources in outer space posed a potential danger to human life and the environment that had not been sufficiently studied, and therefore the proliferation of such power sources should be restricted. The delegation expressing that view was also of the view that States should

be encouraged to develop additional legally binding instruments that regulated, in more detail, the use of nuclear power sources in outer space, taking into account that any activity carried out in outer space must be governed by the principles of the protection of human life and the maintenance of peace.

44. The view was expressed that nuclear power sources were capable of solving a wide range of promising energy-intensive tasks in near and deep space, enabling a new level of advancement of space activities, and that the Principles and the Safety Framework provided a sufficient tool for States and international organizations that were planning to develop space nuclear power source applications; thus, there was no need to revise them. The delegation expressing that view was also of the view that consideration of an issue as important as the use of nuclear power sources should remain exclusively within the framework of the relevant mandate of the Committee and its Scientific and Technical Subcommittee.

45. The view was expressed that in view of the ambitious plans for manned space missions to other bodies of the solar system, such as the Moon and Mars, which might entail the expanded use of nuclear power sources, the Subcommittee should task its Working Group on the Use of Nuclear Power Sources in Outer Space with gathering relevant information about such potential future uses of nuclear power sources in outer space, especially with regard to the use of fission reactors for propulsion or habitation purposes, and, on the basis of that information-gathering, the Working Group could make recommendations about the need for additional international guidance on safety standards and how such standards might best be developed, either through further work within the Working Group or by establishing a new expert group, as had been done when drafting the Safety Framework.

46. Some delegations expressed the view that, as the current Working Group was completing its extended multi-year workplan, an international technical expert group for the safe use of space nuclear power and propulsion systems could be established with the aim of further promoting understanding and awareness of effective processes and of sharing information. Such an expert group could gather and disseminate knowledge and best practices in the development and use of space nuclear power and propulsion systems among Governments, academia, non-profit organizations and private commercial entities, and identify potential needs for the further safety, security and safeguarding of nuclear power sources in outer space, with a view to ensuring the safety, security and sustainability of outer space activities.

47. The view was expressed that the mandate of the Working Group on the Use of Nuclear Power Sources in Outer Space should be renewed under a new multi-year workplan and in accordance with the rules and procedures of the Committee, in order to continue the work on that important subject matter.

48. The view was expressed that it was the responsibility of States to ensure that the use of nuclear power sources in outer space was strictly for peaceful purposes, avoiding at all costs the placement in Earth orbit of any object carrying nuclear weapons or any other type of weapon of mass destruction, as well as avoiding at all costs the placement of such weapons on celestial bodies and the placement of weapons in outer space in any other form.

49. In accordance with paragraph 11 of General Assembly resolution [76/76](#), the Subcommittee, at its 955th meeting, reconvened its Working Group on the Use of Nuclear Power Sources in Outer Space, with Sam A. Harbison (United Kingdom) as Chair.

50. The Working Group on the Use of Nuclear Power Sources in Outer Space held [...] meetings. At its 969th meeting, on 16 February, the Subcommittee endorsed the report of the Working Group, which is contained in annex II to the present report.