



# General Assembly

Distr.: General  
23 February 2022

Original: English

**Committee on the Peaceful  
Uses of Outer Space**  
**Sixty-fifth session**  
Vienna, 1–10 June 2022

## **Report of the Scientific and Technical Subcommittee on its fifty-ninth session, held in Vienna from 7 to 18 February 2022**

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## 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 20 meetings.

### A. Attendance

3. Representatives of the following 83 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, Kuwait, 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. At the same 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. The session was attended by 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), in their capacity 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 Earth Observation Satellites (CEOS), 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, International Space University (ISU), Moon Village Association, National Space Society (NSS), Open Lunar Foundation, Prince Sultan bin Abdulaziz International Prize for Water (PSIPW), Scientific Committee on Solar-Terrestrial Physics, 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/51](#) and [A/AC.105/C.1/2022/INF/51/Corr.1](#).

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 Subcommittee ([A/AC.105/C.1/L.392](#)) were to be renumbered 19 and 20.

17. At the same 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**

19. Statements were made by representatives of the following member States during the general exchange of views: Algeria, Angola, Argentina, Australia, Austria, Brazil, Canada, Chile, China, Colombia, Costa Rica, Cuba, Czechia, Egypt, Finland, France, Germany, India, Indonesia, Iran (Islamic Republic of), Israel, Italy, Japan, Kenya, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, Singapore, Slovakia, Slovenia, South Africa, Spain, Switzerland, Thailand, United Kingdom, United States and Venezuela (Bolivarian Republic of). A statement was made by the representative of Egypt on behalf of the Group of African States, by the representative of Ecuador on behalf of the Group of Latin American and Caribbean States, by the representative of Canada on behalf of the Group of Western European and other States, and by the representative of

Morocco on behalf of the Group of 77 and China. The representative of the European Union, in its capacity as permanent observer, made a statement on behalf of the European Union and its member States. Additional statements were made by the observers for APSCO, CANEUS International, ESA, ESO, For All Moonkind, IAF, ISU, the Moon Village Association, NSS, the Open Lunar Foundation, PSIPW, the Square Kilometre Array Observatory, SGAC, SWF, UNISEC-Global and WSWA. Statements were also made by the Association for the Development of the Atlantic International Research Centre and The Hague Institute for Global Justice, which had been admitted to the session as observers.

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

- (a) “SABIA-Mar satellite mission”, by the representative of Argentina;
- (b) “Passive Reflectometry and Dosimetry (PRETTY): a nanosatellite mission for altimetry and dosimetry”, by the representative of Austria;
- (c) “Kids2Mars, a global, inclusive educational project regarding the planet Mars and its exploration by human and non-human space missions”, by the representative of Brazil;
- (d) “Pilot space programme for schools”, by the representative of Chile;
- (e) “Introduction of the United Nations/China Global Partnership Workshop on Space Exploration and Innovation”, by the representative of China;
- (f) “White paper: China’s space 2021”, by the representative of China;
- (g) “Development of a rocket powered by a detonation engine”, by the representatives of Poland;
- (h) “Space for women: activities and contributions of the Republic of Korea”, by the representative of the Republic of Korea;
- (i) “Latest developments regarding regulation and space flight from the United Kingdom”, by the representative of the United Kingdom;
- (j) “James Webb Space Telescope: discovering the universe”, by the representative of the United States;
- (k) “Landsat’s fiftieth anniversary: looking back, and looking ahead”, by the representative of the United States;
- (l) “Update on the Consortium for Execution of Rendezvous and Servicing Operations”, by the representative of the United States;
- (m) “James Webb Space Telescope: the challenge of the Near-Infrared Spectrograph design”, by the observer for ESA;
- (n) “Moon Village Association and International Moon Day highlights”, by the observers for the Moon Village Association;
- (o) “Update on the status of space solar power development”, by the observer for NSS;
- (p) “Recent activities of PSIPW”, by the observer for PSIPW;
- (q) “Current status of the Scientific Committee on Solar-Terrestrial Physics PRESTO programme for predictability of the variable solar-terrestrial coupling”, by the observer for the Scientific Committee on Solar-Terrestrial Physics;
- (r) “World Space Week 2022: space and sustainability”, by the observer for WSWA.

21. The Subcommittee welcomed the election of Juan Francisco Facetti (Paraguay) as Chair for a two-year term starting in 2022. The Subcommittee expressed its appreciation to the outgoing Chair, Natália Archinard (Switzerland), for her leadership and contribution to furthering the achievements of the Subcommittee during her term of office.

22. At the 955th meeting, on 7 February, the Chair of the Subcommittee made a statement outlining the work of the Subcommittee at its fifty-ninth session. He noted that space technologies had become irreplaceable in everyday life and that increased participation in space activities, the increasing role of the space industry and the private sector and the critical dependency of civilization on space systems were creating emerging challenges in outer space activities. He also noted that, as an engine of progress and socioeconomic development, space science provided life-saving benefits that contributed to global development and prosperity. He emphasized that the Committee and its two Subcommittees were pre-eminent forums for fostering dialogue, reinforcing mutual understanding among nations and promoting international cooperation in the peaceful uses of outer space to maximize the benefits of space science and technology and their applications while taking into account the particular needs of developing countries.

23. At the same meeting, the Director of the Office for Outer Space Affairs made a statement in which she reviewed the work done by the Office since the fifty-eighth session of the Subcommittee, including the quantitative and qualitative expansion of the services rendered by the Office to Member States. In addition, she stressed that the global participation in the Committee demonstrated its unique nature as the platform within the United Nations for collaboration on space affairs with established, emerging and non-spacefaring nations. The Director further announced that she would be leaving the Office in the coming month.

24. The Subcommittee expressed its deep appreciation and gratitude to Simonetta Di Pippo, Director of the Office for Outer Space Affairs, for her outstanding dedication to the work of the Office and to the Committee, and wished her well in her future endeavours.

25. The Subcommittee noted with satisfaction the adoption by the General Assembly of its resolution 76/3, entitled “The ‘Space2030’ Agenda: space as a driver of sustainable development”, and recalled that the “Space2030” Agenda would contribute to enhancing and raising awareness of the benefits of space activities and tools for the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals and targets contained therein, as well as the Sendai Framework for Disaster Risk Reduction 2015–2030 and the Paris Agreement on climate change.

26. The Subcommittee agreed on the following text and noted that Paraguay, in its capacity as Chair of the Subcommittee, would seek its inclusion in the ministerial declaration of the high-level political forum on sustainable development to be held in July 2022: “The ‘Space2030’ Agenda: space as a driver of sustainable development and its implementation plan, adopted by the General Assembly in its resolution 76/3, is a forward-looking strategy for reaffirming and strengthening the contribution of space activities of States members of the Committee on the Peaceful Uses of Outer Space in the use of space tools for the achievement of the Sustainable Development Goals of the 2030 Agenda for Sustainable Development.”

27. The Subcommittee reiterated its commitment to taking a cooperative approach to advancing the exploration and use of outer space and stressed that only through cooperation would it be possible to fully reap the benefits of space science and technology while ensuring that space activities continued to be conducted for peaceful purposes. In that connection, the Subcommittee agreed that international cooperation and dialogue would be essential for effectively addressing the demands and challenges of space and for promoting space as a driver of sustainable development to achieve global, regional and national goals.

28. The Subcommittee agreed that space technology continued to be a valuable tool for the benefit of humankind and the achievement of the Sustainable Development Goals, and that it had become an indispensable element of public infrastructure. Therefore, States members of the Committee must combine their efforts to increase the benefits of space and preserve it for future generations.

29. The Subcommittee agreed that it, together with the Committee and the Legal Subcommittee, and with the support of the Office for Outer Space Affairs, remained a unique international forum tasked with promoting international cooperation in the exploration and peaceful uses of outer space and offering an appropriate environment to discuss matters that had a great impact on the development of States for the betterment of humankind.

30. Some delegations expressed the view that it was important to foster increased international cooperation and to establish principles of responsible behaviour and sustainability of space activities in the common interest of present and future generations. The delegations expressing that view also stressed the need to strengthen commitments to avoid potentially harmful interference with the peaceful exploration and use of outer space, to facilitate equitable access to outer space and to develop initiatives that would enhance the safety and long-term sustainability of outer space activities while increasing confidence and mutual trust.

31. Some delegations expressed regret about the intentional and irresponsible destruction of a satellite in orbit in 2021 that threatened the safety of human space flight and the peaceful exploration and use of outer space.

32. The view was expressed that all the delegations concerned about the defence system test should more carefully study the documents containing international political and legal obligations in that field before making any assessments as to the test and should refrain from the politicization of future discussions in the Committee.

33. Some delegations expressed the view that, in order for it to achieve its main objectives, it was important for the Scientific and Technical Subcommittee to concentrate its work in areas such as the building and promotion of technological capacities, the transfer of technology to developing countries, the prevention and mitigation of natural disasters and scientific and technological research in developing countries, all within the framework of international cooperation. The delegations expressing that view were also of the view that developing countries should not be left behind or unfairly disadvantaged by space exploration efforts, and emphasized that the only way to ensure the sustainability of outer space activities was to continue to deliver the benefits derived from those activities to humanity as a whole through enhanced cooperation and collaboration, and that States should refrain from promulgating, adopting and applying any unilateral economic, financial and/or trade measures and actions not in accordance with international law and the Charter of the United Nations that could impede access to space and space activities, particularly in developing countries.

34. Some delegations welcomed the growing support for the Artemis Accords on the Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes as an operational framework to ensure that the peaceful exploration of space remained transparent, safe and sustainable. Those delegations encouraged nations interested in those principles to sign the Accords.

35. Some delegations expressed the view that cooperation on the planned lunar research station initiated by China and the Russian Federation provided new opportunities to explore space, and encouraged all States to join in that initiative.

36. The view was expressed that the Artemis programme would land the first woman and next man on the lunar surface to sustainably use what was learned there to enable humanity's next giant leap, namely, sending astronauts to Mars.

37. Some delegations expressed the view that the Subcommittee should remain the main forum for the enhancement of cooperation in the peaceful uses of outer space and that, in that connection, the Office for Outer Space Affairs and Member States should provide greater support to enhance both North-South and South-South cooperation aimed at facilitating the transfer of technology among nations, as well as at making more opportunities available for enhanced academic linkages, long-term fellowships and further collaboration among national and regional laboratories,

United Nations research centres and other national and international institutions, including in developing countries, in relation to space matters.

38. Some delegations welcomed the programme presented by the Secretary-General in his report entitled “Our Common Agenda” (A/75/982). The delegations expressing that view also expressed the view that it was necessary to support the inclusion of space among the eight areas to be followed up on at the highest level in the framework of the preparation for the Summit of the Future. In addition, those delegations expressed concern about the risks posed to the safety, security and long-term sustainability of outer space activities.

39. In that context, the view was expressed that the status of non-governmental organizations and the private sector in outer space activities was fully regulated by the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, of 1967 and must not be revised.

40. The Subcommittee was informed of the conference room paper submitted by SGAC, entitled “Space generation advocacy and policy platform” (A/AC.105/C.1/2022/CRP.9), and of the two conference room papers submitted by the Moon Village Association, entitled “Report of the Moon Village Association on International Moon Day: implementation status” (A/AC.105/C.1/2022/CRP.16) and “Report of the Moon Village Association on the Global Expert Group on Sustainable Lunar Activities: status/plan” (A/AC.105/C.1/2022/CRP.17).

41. The Subcommittee expressed its gratitude to the organizers of the following events, held on the margins of the fifty-ninth session of the Subcommittee:

- (a) “Space popularization for the next generation”, organized by APSCO;
- (b) “Data protection and artificial intelligence”, organized by CANEUS International;
- (c) “Announcement of awardees for the sixth round of KiboCUBE”, organized by the Office for Outer Space Affairs and the Japan Aerospace Exploration Agency (JAXA);
- (d) “Development financing for space research”, organized by CANEUS International.

## **E. National reports**

42. 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**

43. 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.

44. 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.

45. The first segment, on recommendations from the United Nations/Spain/IAU 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, IAU; and Andrew Williams, ESO.

46. 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/IAU Conference on Dark and Quiet Skies for Science and Society; and Wang Fengyu, China National Space Administration.

47. The third segment was a question-and-answer session that was 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 IAU Centre for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference; Aarti Holla-Maini; and Chris Hofer.

48. 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**

49. After considering the items before it, the Subcommittee, at its 974th meeting, on 18 February, 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.

## **II. United Nations Programme on Space Applications**

50. In accordance with General Assembly resolution [76/76](#), the Subcommittee considered agenda item 5, entitled “United Nations Programme on Space Applications”.

51. The representatives of China, France, India, Indonesia, Japan and the Russian Federation made statements under agenda item 5. During the general exchange of views, statements relating to the item were made by representatives of other member States.

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

(a) “Capacity-building activities in geospatial technologies in India”, by the representative of India;

(b) “Eurasian space educational centre”, by the representative of the Russian Federation;

(c) “Global school student small satellites”, by the observer for CANEUS International.

53. The Subcommittee had before it the following:

(a) Report on the United Nations/Austria Symposium on Space Applications for Food Systems, held online from 7 to 9 September 2021 ([A/AC.105/1254](#));

(b) Report on the United Nations/United Arab Emirates/IAF Workshop on Space Technology for Socioeconomic Benefits, on the theme “Space exploration: a source of inspiration, innovation and discovery”, held in Dubai, United Arab Emirates, from 22 to 24 October 2021 ([A/AC.105/1256](#));

(c) Conference room paper entitled “The Space4Water project: community-building” (A/AC.105/C.1/2022/CRP.15).

## A. Activities of the United Nations Programme on Space Applications

54. The Subcommittee recalled that the General Assembly, in its resolution [76/76](#), had recognized the capacity-building activities under the United Nations Programme on Space Applications, which provided unique benefits for Member States, in particular developing countries, participating in those activities.

55. At the 955th meeting, on 7 February, the Director of the Office for Outer Space Affairs apprised the Subcommittee of the status of the Office’s activities under the United Nations Programme on Space Applications.

56. The Subcommittee noted with appreciation that, since its previous session, cash and in-kind contributions, including the provision of staff on a non-reimbursable loan basis, had been offered for the activities of the Office by the following donors: Airbus Defence and Space; Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology and Federal Ministry for European and International Affairs of Austria; Avio S.p.A; Brazilian Air Force; Center of Applied Space Technology and Microgravity; China Manned Space Agency; China National Space Administration; ESA; Government of France; City of Graz, Austria; Graz University of Technology, Austria; Institute of Astrophysics of the Canary Islands, Spain; IAU; JAXA; Joanneum Research; Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences; Kyushu Institute of Technology, Japan; PSIPW; Sierra Nevada Corporation; and Government of the United States.

57. The Subcommittee noted that the capacity-building activities under the United Nations Programme on Space Applications provided unique benefits to Member States participating in those activities, in particular developing countries. The Subcommittee also noted that the availability of webinars and videos of activities that were accessible through online platforms delivered under the Programme increased the capabilities of developing countries to access and use space technologies and to strengthen long-term fellowships in space science and technology education.

58. The Subcommittee noted that the United Nations Programme on Space Applications had enabled national programmes on space applications to disseminate information and knowledge to a wider audience and achieve greater development. The Subcommittee also noted that national institutional mechanisms driven by user requirements could facilitate the development of programmes to ensure socioeconomic security, promote sustainable development and the responsible use of natural resources, improve governance and support disaster risk reduction.

59. The Subcommittee noted that under the Basic Space Technology Initiative, and in cooperation with the Office for Outer Space Affairs, the Kyushu Institute of Technology continued to offer students from developing countries opportunities to participate in the “Post-Graduate Study on Nanosatellite Technology” fellowship programme.

60. The Subcommittee noted the Drop Tower Experiment Series, a fellowship programme of the Office for Outer Space Affairs undertaken in collaboration with the Center of Applied Space Technology and Microgravity and the German Aerospace Center (DLR), in which students could study microgravity by performing experiments in a drop tower. In the seventh cycle of the fellowship programme, a team from Universidad Católica Boliviana, Plurinational State of Bolivia, had been awarded the fellowship through a competitive selection process and was expected to conduct its experiment in 2022.

61. The Subcommittee noted that CubeSats developed by teams from Kenya, Guatemala and Mauritius, winners in the first, second and third rounds, respectively, had been deployed from the International Space Station through the United Nations/Japan Cooperation Programme on CubeSat Deployment from the

International Space Station Japanese Experiment Module, known as “KiboCUBE”. Teams from Indonesia, the Republic of Moldova and the Central American Integration System (SICA), winners in the third, fourth and fifth rounds, respectively, were currently developing their CubeSats under the programme. The Subcommittee further noted that the KiboCUBE programme had become an essential tool for capacity-building in space science and technology and that, in that regard, the Office for Outer Space Affairs and JAXA had announced the extension of the KiboCUBE programme until the end of December 2024 and had added a new educational opportunity called “KiboCUBE Academy”.

62. The Subcommittee noted the continued cooperation between the Office for Outer Space Affairs and the Government of China, through the China Manned Space Agency, in implementing United Nations/China cooperation on the utilization of the China Space Station initiative, as part of the Access to Space for All initiative. That innovative and forward-looking cooperation was aimed at providing scientists around the world with an opportunity to conduct their own experiments on board the China Space Station, thus opening space exploration activities to all countries and creating a new paradigm for building capabilities in space science and technology. The first opportunity to conduct scientific experiments on board the China Space Station had been open to all Member States, in particular developing countries. As an outcome of the application and selection process, nine projects had been selected for implementation on board the China Space Station in the first cycle. The nine projects involved 23 institutions from 17 Member States in the Asia-Pacific region, Europe, Africa, North America and South America. The first experiments would be sent to the China Space Station in early 2023.

63. The Subcommittee noted the Hypergravity Experiment Series (HyperGES), a fellowship programme of the Office for Outer Space Affairs undertaken in collaboration with ESA. Under the programme, students could better understand and describe the influence of gravity on systems by performing experiments in the Large Diameter Centrifuge facility located at the European Space Research and Technology Centre of ESA in Noordwijk, the Netherlands. The winner of the first fellowship under HyperGES had been announced in June 2020, and a team from Mahidol University, Thailand, had been selected on the basis of its proposal to study the effects of hypergravity on watermeal, an aquatic plant. The team was currently developing its experiment and was expected to conduct the experiment in 2022. A new announcement of opportunity had also been published in 2021, with the winner also to implement an experiment in 2022.

64. The Subcommittee noted the joint United Nations/Airbus Defence and Space technical assistance programme on the Bartolomeo external platform on board the International Space Station. The programme offered Member States, through a competitive selection process, the opportunity to have a payload hosted on the Bartolomeo platform, and the selected awardee would receive a comprehensive range of mission services provided by Airbus Defence and Space. The first awardees were the Egyptian Space Agency, the Kenya Space Agency and the Ministry of Science, Technology and Innovation of Uganda.

65. The Subcommittee noted the cooperation programme on the utilization of the Vega-C launcher, implemented in collaboration with Avio S.p.A. The programme was aimed at providing educational and research institutions in developing countries that had developed a CubeSat of 3U size or smaller with the opportunity, through a competitive process, to put their CubeSat into orbit. The first announcement of opportunity had been issued in October 2020 and closed on 4 April 2021, and a pre-selection process was under way.

66. The Subcommittee noted the “ISONscope” telescope provision cooperation programme, carried out by the Office for Outer Space Affairs in collaboration with the Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences. The programme was aimed at offering academic and research institutions the opportunity to receive, through a competitive selection process, small telescopes and

associated capacity-building in astronomy. The first announcement of opportunity had been issued in January 2021, and the selected winners were the Kenya Space Agency and the Centre for Basic Space Science of Nigeria.

67. The Subcommittee noted that the United Nations Programme on Space Applications continued to implement the Access to Space for All initiative, which was focused on developing the capacity of Member States to access the benefits of space and which offered to its partners research opportunities to develop the technologies needed to send hardware into space, access to unique ground and orbital facilities for experiments in microgravity and access to space data and training on their use, including the use of astronomical data.

68. The Subcommittee also noted that the Programme was aimed at promoting, through international cooperation, the use of space technologies and space-related data for sustainable economic and social development in developing countries by establishing or strengthening the capacity in those countries to use space technology; raising awareness among decision makers of the cost-effectiveness and additional benefits to be obtained from such technologies and data; and strengthening outreach activities to increase awareness of those benefits.

69. The Subcommittee further noted the following activities under the United Nations Programme on Space Applications conducted by the Office for Outer Space Affairs in 2021, together with Member States and international organizations:

(a) United Nations/Austria Symposium on Space Applications for Food Systems;

(b) United Nations/United Arab Emirates/IAF Workshop on Space Technology for Socioeconomic Benefits, on the theme “Space exploration: a source of inspiration, innovation and discovery”.

70. The Subcommittee was informed that the Office for Outer Space Affairs had organized, or continued to organize, capacity-building events, including within the United Nations Programme on Space Applications, with the Governments of Austria, Brazil, Ghana, Mongolia, Spain and the United Arab Emirates, as well as with IAF. The events planned to be held in the near future would cover the following topics: space-based solutions for water resources management; global navigation satellite systems; space weather; space for climate action; and capacity-building in space technology and applications. The Subcommittee noted that the Office would present reports and further information on the events at the sixtieth session, to be held in 2023.

71. The Subcommittee noted that, in addition to the United Nations conferences, training courses, workshops, seminars and symposiums conducted in 2021 and planned for 2022, the Office for Outer Space Affairs had conducted or was planning to conduct other activities under the United Nations Programme on Space Applications, with emphasis on:

(a) Providing support for capacity-building efforts in developing countries through the regional centres for space science and technology education, affiliated to the United Nations;

(b) Strengthening its long-term fellowship programme to include support for the implementation of pilot projects;

(c) Ensuring the mainstreaming of a gender perspective into all of its activities;

(d) Promoting the participation of young people in space activities;

(e) Promoting access to space for people with disabilities;

(f) Supporting or initiating pilot projects as a follow-up to activities of the Programme in areas of priority interest to Member States;

- (g) Providing technical advice, upon request, to Member States, bodies and specialized agencies of the United Nations system and relevant national and international organizations;
- (h) Enhancing access to space-related data and other information;
- (i) Applying an integrated and cross-sectoral approach to activities, as appropriate.

72. The Subcommittee also noted the highlights of the activities of the regional centres for space science and technology education, affiliated to the United Nations, namely, the African Regional Centre for Space Science and Technology Education – in English Language, the African Regional Centre for Space Science and Technology – in French Language, the Centre for Space Science and Technology Education in Asia and the Pacific, the Regional Centre for Space Science and Technology Education for Latin America and the Caribbean, the Regional Centre for Space Science and Technology Education for Western Asia and the Regional Centre for Space Science and Technology Education in Asia and the Pacific (China).

73. The Subcommittee noted that in 2021, the Regional Centre for Space Science and Technology Education in Asia and the Pacific (China), affiliated to the United Nations, had recruited 35 students in three fields of study, namely, satellite communications and global navigation satellite systems, remote sensing and geographic information systems, and small satellite technology, including 25 students in master’s programmes and 10 students in doctoral programmes. In addition, 24 master’s students and 4 doctoral students had successfully defended their dissertations and theses and graduated.

74. The Subcommittee was reminded that the General Assembly, in its resolution [76/76](#), had noted with satisfaction the positive conclusion of the evaluation mission for the establishment of a new regional centre for space science and technology education in the Eurasian region. The delegation bringing that to the attention of the Subcommittee also expressed the view that, upon the completion of all domestic procedures by the Russian Federation, which would be in the near future, the secretariat of the regional centre would be ready to sign an agreement on affiliation with the United Nations.

## **B. Regional and interregional cooperation**

75. The Subcommittee recalled that the General Assembly, in its resolution [74/82](#), had emphasized that regional and interregional cooperation in the field of space activities was essential to strengthen the peaceful uses of outer space, assist Member States in the development of their space capabilities and contribute to the implementation of the 2030 Agenda. To that end, the Assembly had requested relevant regional organizations and their groups of experts to offer any assistance necessary so that countries could carry out the recommendations of regional conferences. In that regard, the Assembly had noted the importance of the equal participation of women in all fields of science and technology.

76. The Subcommittee noted that Africa Space Week would be held in Nairobi in September 2022 and would provide an innovative platform for African space industry stakeholders to deliberate on expanding Africa’s space industry and strengthen efforts to promote and enable intra-Africa and international cooperation on space activities.

77. The Subcommittee also noted that the twenty-seventh session of the Asia-Pacific Regional Space Agency Forum, on the theme “Expand space innovation through diverse partnerships”, had been held online from 30 November to 3 December 2021.

78. The Subcommittee noted that the fifteenth meeting of the Council of APSCO had been held online from 9 to 11 November 2021. The Council had approved the APSCO project implementation plan for 2021–2025 and the amendment of the rules on cooperative activities of APSCO.

### III. Space technology for sustainable socioeconomic development

79. In accordance with General Assembly resolution 76/76, the Subcommittee considered agenda item 6, entitled “Space technology for sustainable socioeconomic development”.

80. The representatives of Algeria, China, Colombia, Cuba, France, India, Iran (Islamic Republic of), Israel, Japan, Mexico, Pakistan, the Russian Federation, Thailand and Venezuela (Bolivarian Republic of) made statements under agenda item 6. During the general exchange of views, statements relating to the item were made by representatives of other member States.

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

(a) “The new Copernicus Sentinel-1 global flood monitoring service”, by the representative of Austria;

(b) “SDGSAT-1: a frontier technology of the Technology Facilitation Mechanism for the Sustainable Development Goals”, by the representative of China;

(c) “Space development of Paraguay”, by the representative of Paraguay;

(d) “Development of human potential in space science and technology for sustainable development”, by the representative of the Russian Federation;

(e) “Student small satellite project and future initiatives for young generation capacity-building”, by the observer for APSCO.

82. The Subcommittee had before it a conference room paper containing the report on the United Nations/Brazil/United Arab Emirates Space for Women expert meeting, on the theme “Initiatives, challenges and opportunities for women in space”, held on 21 and 22 October 2021 in Dubai, United Arab Emirates (A/AC.105/C.1/2022/CRP.19).

83. The Subcommittee noted the value of space technology and applications, as well as of space-derived data and information, to sustainable development, including in terms of improving the formulation and subsequent implementation of policies and programmes of action relating to environmental protection, land and water management, the development of degraded land and wastelands, urban and rural development, marine and coastal ecosystems, health care, climate change, disaster risk reduction and emergency response, energy, infrastructure, navigation, transport and logistics, rural connectivity, seismic monitoring, natural resources management, snow and glaciers, biodiversity, agriculture and food security.

84. The Subcommittee also noted, in that context, the information provided by States on their use of space-based platforms and satellite systems in support of sustainable socioeconomic development, as well as actions and programmes aimed at increasing society’s awareness and understanding of the applications of space science and technology for meeting development needs, and on cooperation activities aimed at building capacity through education and training on the use of space science and technology applications for sustainable development.

85. The Subcommittee noted that the Committee, and its Subcommittees, with the support of the Office for Outer Space Affairs, had a fundamental role to play in promoting international cooperation and capacity-building in support of socioeconomic development.

86. Some delegations expressed the view that it was crucial to promote international cooperation between countries with advanced space capabilities and emerging countries in the space sector in order to support them in their efforts to access space, space-derived data and research and facilitate the transfer of knowledge and technology, as well as the sharing of experience in the use of space-based technology for sustainable development.

87. In accordance with paragraph 11 of General Assembly resolution 76/76, the Working Group of the Whole was reconvened, with Prakash Chauhan (India) as Chair.

88. At its 971st meeting, on 17 February, the Subcommittee endorsed the report of the Working Group of the Whole, which is contained in annex I to the present report.

#### **IV. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment**

89. In accordance with General Assembly resolution 76/76, the Subcommittee considered agenda item 7, entitled “Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment”.

90. The representatives of Argentina, Canada, China, France, India, Indonesia, Iran (Islamic Republic of), Israel, Italy, Japan, Kenya, Mexico, the Netherlands, Panama, the Russian Federation, South Africa, Thailand and the United States made statements under agenda item 7. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

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

(a) “Indigenous mapping workshop and satellite Earth observation”, by the representatives of Canada;

(b) “Advances in resource mapping from space: development of Earth observing dashboards”, by the representative of the Islamic Republic of Iran;

(c) “Open access to Italian Earth observation satellite data: the Italian Space Agency (ASI) open call initiative”, by the representative of Italy;

(d) “Monitoring mangrove forests in the Philippines using remote sensing”, by the representative of the Philippines.

92. In the course of the discussions, delegations reviewed national, bilateral, regional and international programmes on remote sensing, in particular in the following areas: monitoring the broader impacts of climate change; land use and land cover monitoring; natural resource management; monitoring of forests and wildfires; detection of illegal fishing; monitoring of oil pipelines and illegal extraction; monitoring of protected marine areas and marine species; environmental monitoring; monitoring of the atmosphere, greenhouse gases and air pollution; urban planning; disaster management support; telehealth and epidemiology; watershed monitoring and development planning; irrigation infrastructure assessment; agriculture, horticulture and crop production forecasting; desertification monitoring; snow and glacier monitoring; and monitoring of oceans, glacial lakes and other water bodies.

93. Some delegations expressed the view that remote sensing of the Earth was important for advancing the Sustainable Development Goals. The integration of Earth observation data with statistical data systems and geospatial data could serve the compilation and monitoring of many Sustainable Development Goal indicators, and collaboration within dedicated international expert bodies, such as CEOS or the Group on Earth Observations, remained useful in that context.

94. Some delegations expressed the view that remote sensing served the monitoring of the impact of the coronavirus disease (COVID-19) and that platforms for sharing data derived from Earth observation were relevant and useful.

95. Some delegations expressed the view that, while national remote sensing activities and missions were conducted primarily for governmental purposes, providing open and cost-free access to satellite data and images, as well as direct satellite downlinks to international partners, should be encouraged, and that the use

of remote sensing technology applications to support societal and commercial development should also be encouraged and promoted.

96. Some delegations mentioned the importance of capacity-strengthening initiatives in improving, expanding and facilitating access to information and data obtained from activities involving the use of remote sensing. In that regard, the role of web-based educational solutions was emphasized.

97. The view was expressed that the policies covering remote sensing data-sharing and the expansion of international cooperation for the non-discriminatory use of satellite data by all countries were important factors to consider in order to benefit society.

98. The view was expressed that the international charter of the Space Climate Observatory, which was scheduled to be put into force on 1 September 2022, would enable the Space Climate Observatory to strengthen the network of countries and international organizations tackling climate change.

## V. Space debris

99. In accordance with General Assembly resolution [76/76](#), the Subcommittee considered agenda item 8, entitled “Space debris”.

100. The representatives of China, Colombia, Germany, India, Indonesia, Iran (Islamic Republic of), Japan, Luxembourg, Mexico, the Netherlands, Pakistan, the Republic of Korea, the Russian Federation, South Africa, Spain, Thailand, the United Kingdom, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 8. The observer for SWF also made a statement under the item. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

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

- (a) “India’s efforts in space debris management”, by the representative of India;
- (b) “Space situational awareness activities in the Republic of Korea”, by the representative of the Republic of Korea;
- (c) “IADC activities overview and latest updates of IADC documents”, by the representative of the Republic of Korea;
- (d) “United States space debris environment and activity updates”, by the representatives of the United States;
- (e) “Space sustainability activities of ESA in 2021”, by the observer for ESA;
- (f) “Multi-satellite low Earth orbit constellations: interferences for routine space activities and astronomical observations – threats of uncontrolled space debris formation”, by the observer for CANEUS International.

102. The Subcommittee had before it the information on research on space debris, the safety of space objects with nuclear power sources on board and problems relating to the collision of such objects with space debris, contained in the replies received from Member States and international organizations (see [A/AC.105/C.1/120](#), [A/AC.105/C.1/120/Add.1](#) and [A/AC.105/C.1/2022/CRP.11](#)).

103. The Subcommittee noted with satisfaction that the endorsement by the General Assembly, in its resolution [62/217](#), of the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space had proved vital in controlling the space debris problem for the safety of future space missions.

104. The Subcommittee also noted with satisfaction that many States and international intergovernmental organizations were implementing space debris mitigation measures consistent with the Space Debris Mitigation Guidelines and the

Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee (A/74/20, annex II) and/or the Space Debris Mitigation Guidelines of the Inter-Agency Space Debris Coordination Committee (IADC), and that a number of States had harmonized their national space debris mitigation standards with those guidelines.

105. The Subcommittee noted that some States were using the Space Debris Mitigation Guidelines of the Committee, the Space Debris Mitigation Guidelines of IADC, ISO standard ISO 24113:2011 (Space systems: space debris mitigation requirements) and ITU recommendation ITU-R S.1003 (Environmental protection of the geostationary-satellite orbit) as reference points in their regulatory frameworks for national space activities.

106. The Subcommittee also noted that, in the area of space debris, some States were cooperating under the space surveillance and tracking support framework funded by the European Union and in the space safety programme of ESA.

107. The Subcommittee expressed concern at the increasing amount of space debris and encouraged States, agencies, industry and academic institutions that had not yet done so to consider voluntarily implementing the Space Debris Mitigation Guidelines and the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee.

108. The Subcommittee noted that IADC, whose initial work had served as the basis for the Space Debris Mitigation Guidelines of the Committee, had updated its own Space Debris Mitigation Guidelines in 2021 to reflect the evolving understanding of the space debris situation.

109. The Subcommittee noted with appreciation that States had undertaken a number of actions to mitigate space debris, such as improving the design of launch vehicles and spacecraft, developing special software, reorbiting satellites, passivation, life extension, end-of-life operations and disposal. The Subcommittee noted the evolving technologies related to the on-orbit robotic servicing of satellites, the extension of satellite lifespans and active space debris removal.

110. The Subcommittee noted the development and application of new technologies and ongoing research related to space debris mitigation; measuring, characterizing, continuous monitoring and modelling of space debris; prediction, early warning and notification of space debris re-entry and collision; protecting space systems from space debris; on-orbit servicing, refuelling and assembly technologies; and re-entry and collision avoidance techniques.

111. Some delegations expressed their serious concern over the placement of large constellations and megaconstellations of satellites and its implications, and, in that connection, expressed the view that that topic should be treated by the Subcommittee as a priority, with a view to mitigating the creation of space debris.

112. Some delegations expressed the view that the removal and mitigation of space debris should be carried out under an internationally agreed framework by the major contributors to space debris creation.

113. Some delegations expressed the view that spacefaring nations should fulfil their historical and substantial responsibility for the mitigation of debris and put forward a viable plan to reduce the production of debris, followed by a workable strategy to collect the debris produced.

114. Some delegations expressed the view that developing countries needed to have access to technologies and methodologies for the measurement, monitoring and characterization of space debris and other space objects.

115. Some delegations expressed the view that it was necessary to build capacity and develop ways and means to transfer knowledge and technology in space debris mitigation in order to make space debris mitigation standards practical for implementation.

116. The view was expressed that all States should contribute to improving the quality of orbital data and increase the exchange of data and information on space operations and the space environment.

117. The view was expressed that relevant data-sharing and exchange among international space agencies and entities should be encouraged for effective monitoring and mitigation of space debris.

118. Some delegations expressed the view that all nations should refrain from the intentional destruction of spacecraft that significantly increased the risk to human space flight and other space activities. Those delegations expressed the view that the Space Debris Mitigation Guidelines of the Committee must apply to the full range of governmental and private sector space activities to foster a safe, sustainable space environment.

119. The view was expressed that guideline 4 of the Space Debris Mitigation Guidelines of the Committee recognized the situations in which intentional break-ups were necessary and specified that such break-ups should be conducted at sufficiently low altitudes to limit the orbital lifetime of the resulting fragments.

120. The view was expressed that it was necessary to accelerate the establishment of a global network for monitoring space debris by laser telemetry for enhanced orbital predictions.

121. The view was expressed that it was necessary to establish an international platform, under the auspices of the Office for Outer Space Affairs, for sharing information, knowledge and technology for orbital manoeuvring and making the software required for conjunction assessment accessible for all States.

122. The view was expressed that it was necessary to implement space traffic management measures in view of the growth of megaconstellations.

123. The view was expressed that it was important to improve and refine the existing space debris mitigation guidelines and to promote the development of binding international standards.

## VI. Space-system-based disaster management support

124. In accordance with General Assembly resolution [76/76](#), the Subcommittee considered agenda item 9, entitled “Space-system-based disaster management support”.

125. The representatives of Algeria, Argentina, Canada, China, Colombia, France, Germany, Greece, India, Indonesia, Iran (Islamic Republic of), Italy, Japan, Luxembourg, Mexico, Pakistan, the Philippines, the Russian Federation, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 9. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

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

(a) “Integrated application of Earth observations for disaster risk reduction: the international cooperation project and how it supports monitoring under the Sendai Framework for Disaster Risk Reduction”, by the representative of China;

(b) “Typhoon Rai damage assessment mapping using Sentinel-1 synthetic aperture radar and Operational Satellite Applications Programme (UNOSAT)/United Nations Institute for Training and Research (UNITAR) data”, by the representative of the Philippines.

127. The Subcommittee had before it the following:

(a) Report on the United Nations/Islamic Republic of Iran Workshop on Space Technology Applications for Drought, Flood and Water Resource Management, held online from 9 to 11 August 2021 ([A/AC.105/1253](#));

(b) Report on activities carried out in 2021 in the framework of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) ([A/AC.105/1250](#)).

128. The Subcommittee noted with satisfaction the progress achieved through activities undertaken in 2021 in the framework of UN-SPIDER and the continuing advisory and other support provided through UN-SPIDER to emergency response efforts.

129. The Subcommittee noted that, with the continued support of its network of partners, including the regional support offices, UN-SPIDER had carried out the following activities during 2021:

(a) Online support for several countries in Africa, Asia and Latin America and the Caribbean;

(b) Continued employment of short-term consultants to carry out activities at the national level in Mongolia and Sri Lanka;

(c) Eleventh coordination meeting of the UN-SPIDER regional support offices;

(d) Project management course on the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (also called the International Charter on Space and Major Disasters) and the mapping of areas affected by floods, earthquakes and landslides with satellite images;

(e) Thematic meeting on locust surveillance, held on 17 March 2021;

(f) Regional expert meeting for Southern Africa on the theme “Space-based solutions for disaster risk management and emergency response”, held online from 13 to 15 July 2021;

(g) International conference on space solutions for disaster management in Africa, organized by the UN-SPIDER regional support office in Bonn, Germany, from 6 to 8 November 2021.

130. As part of those activities, specific requirements had been addressed and follow-up support had been provided to countries in which UN-SPIDER technical advisory missions had been carried out in previous years.

131. The Subcommittee noted with satisfaction the capacity-strengthening efforts carried out by UN-SPIDER, including the generation of tailored space-based information for countries in need.

132. The Subcommittee noted the continued outreach activities, including webinars and virtual expert meetings, carried out by the Office for Outer Space Affairs through UN-SPIDER, and the Office’s partnerships with United Nations entities, international organizations and Member States aimed at continuing to promote the use of space-based tools and information to support disaster management and disaster risk reduction.

133. The Subcommittee noted broader ongoing activities aimed at increasing the availability and use of space-based solutions in support of disaster management and emergency response. Those activities included promoting the use of emergency Earth observation and geospatial data during natural or technological disasters through mechanisms such as the International Charter on Space and Major Disasters, the Sentinel Asia project and the Copernicus Emergency Management Service.

134. The Subcommittee noted that while States continued to benefit from or support international initiatives such as the International Charter on Space and Major Disasters, Sentinel Asia and UN-SPIDER, or to collaborate through specialized bodies such as CEOS, some States had developed their own disaster management and emergency response procedures that utilized the resources of space agencies and the expertise of other national actors to implement standard operating procedures and provided early warning, in-time emergency response and post-disaster space-based

services such as satellite telecommunications, making use of Earth observation images, spatial information, real-time web applications and technical support by specialists for countries affected by climate change or fires, landslides, floods, tsunamis, drought, volcanic eruptions, earthquakes or oil spills, for maritime search and rescue operations, and for supply disruptions arising from the COVID-19 pandemic.

135. Some delegations expressed the view that, as climate change, water events and natural disasters were becoming more frequent and severe, with an increasing number of major natural disaster-related events and associated damage occurring in 2021, national authorities around the world would increasingly turn to satellite data and services to provide critical services to society, and that international collaboration and a multilateral approach were crucial in that regard to solve those global problems and reduce their adverse effects on human life, property and economies.

136. The Subcommittee noted the financial and staff resource contributions made by China, France and Germany to UN-SPIDER and the in-kind contributions, including the provision of experts, made by some States members of the Committee and by the regional support offices in 2021 in support of the activities conducted by the Office for Outer Space Affairs through UN-SPIDER, as well as their efforts to share experience with other interested countries.

## VII. Recent developments in global navigation satellite systems

137. In accordance with General Assembly resolution [76/76](#), the Subcommittee considered agenda item 10, entitled “Recent developments in global navigation satellite systems”, and reviewed matters related to the International Committee on Global Navigation Satellite Systems (ICG), the latest developments in the field of global navigation satellite systems (GNSS) and new GNSS applications.

138. The representatives of China, India, Indonesia, Japan, Mexico, Pakistan, the Republic of Korea, the Russian Federation and the United States made statements under agenda item 10. During the general exchange of views, statements relating to the item were made by representatives of other member States.

139. The Subcommittee heard a technical presentation entitled “Development of the BeiDou Navigation Satellite System”, by the representative of China.

140. The Subcommittee had before it the report of the Secretariat on activities carried out in 2021 in the framework of the workplan of ICG ([A/AC.105/1249](#)) and a report on the United Nations/Mongolia workshop on the applications of global navigation satellite systems, held in Ulaanbaatar from 25 to 29 October 2021 ([A/AC.105/1252](#)). It was noted that the note by the Secretariat on the fifteenth meeting of ICG would be submitted to the Committee for consideration at its sixty-fifth session, in 2022.

141. The Subcommittee noted that ICG was an important platform for communication and cooperation in the field of GNSS, especially in the areas of compatibility and interoperability among the different systems and GNSS spectrum protection and interference detection.

142. The Subcommittee also noted that the Office for Outer Space Affairs, as the executive secretariat of ICG, continued to play an active role in facilitating cooperation and communication among the providers and users of GNSS and hosted the fifteenth meeting of ICG, held in Vienna from 27 September to 1 October 2021, and the twenty-fourth meeting of the Providers’ Forum, held in Vienna on 27 September and 1 October 2021.

143. The Subcommittee expressed its appreciation to the Office for its efforts in promoting the use of GNSS through its capacity-building and information dissemination initiatives, in particular in developing countries.

144. The Subcommittee further noted that, through ICG, all providers had agreed on the information presented in the second edition of the publication entitled *The*

*Interoperable Global Navigation Satellite Systems Space Service Volume (ST/SPACE/75/Rev.1)* and on a number of recommendations on continuing the development, support and expansion of the multi-GNSS space service volume concept. That would enable improved navigation for future space operations that went beyond a geosynchronous equatorial orbit and even for lunar missions.

145. The Subcommittee noted that the United States had continued to upgrade the capability and service of its Global Positioning System (GPS) through the integration of the next generation of satellites, GPS Block III, which were broadcasting the new L1C signal, in addition to L2C, L5 and the L1C/A signal. It was noted that two Block III satellites had been launched in 2021, bringing the total number of GPS III satellites in orbit to five, and that additional satellites would become available in the coming months and years as the modernization effort moved forward. In addition to those space segment enhancements, the United States continued its effort to upgrade the GPS ground control system to support the new capabilities enabled by the Block III and Block IIIIF satellites. It was noted that the new GPS Next Generation Operational Control System (OCX) was being developed in phases, and further performance improvements and increased capabilities for all users were foreseen as the rollout was completed.

146. The Subcommittee noted that the United States intended to continue improving the accuracy and availability of GPS through the enhanced performance of the most advanced satellites. The United States intended to continue to broadcast GPS signals free of direct user charges and was committed to keeping GPS as an important pillar in an emerging international system of GNSS.

147. The Subcommittee noted that in 2021, the Russian Federation had started a new 10-year federal programme for maintaining, developing and using its Global Navigation Satellite System (GLONASS). The fourth generation of satellites, GLONASS-K2, was planned to be launched in 2022 and would transmit code division multiple access (CDMA) signals in the L1, L2 and L3 radio frequency bands in addition to frequency division multiple access (FDMA) signals in the L1 and L2 radio frequency bands. By 2030, at least 18 such satellites would be launched, and because of their signal-in-space user ranging accuracy, those satellites would provide an average user equivalent range error of 30 cm.

148. The Subcommittee also noted that the System for Differential Correction and Monitoring, an augmentation of GLONASS, continued to be updated and was to be used in civil aviation for enhancing navigation precision. It was noted that the next step would be the deployment of the GLONASS high-orbit space complex, consisting of six satellites in inclined geosynchronous orbits. Those satellites would transmit three CDMA signals and improve the accuracy and availability of the GLONASS service in difficult terrain, such as the Arctic region and dense urban areas.

149. The Subcommittee noted that the BeiDou Navigation Satellite System constellation of China had continued to be improved and to expand its applications. It was noted that positioning, navigation and timing services, as measured by the global monitoring and evaluation system, had a global horizontal positioning accuracy of approximately 1.52 meters and a vertical positioning accuracy of approximately 2.64 meters. Regarding the satellite-based augmentation service, it was noted that the Civil Aviation Administration of China was preparing a test and evaluation of satellite-ground integration and that positioning accuracy, alarm time, integrity risk and other indicators had met requirements. Meanwhile, in terms of the ground-based augmentation system, real-time centimetre-level and post-event millimetre-level high-precision services had been provided within China for industry and public sector users.

150. The Subcommittee further noted that the testing and verification of mass alerts sent using short message service communication to mobile phones had been completed and would be implemented on a large scale. It was also noted that BeiDou receivers and search and rescue services would be supported through the release by

the International Electrotechnical Commission of a global standard for the detection of emergency markers for maritime distress and safety systems.

151. The Subcommittee noted that the European Satellite Navigation System (Galileo) of the European Union provided accurate positioning and timing information and that its data were used for a broad range of applications.

152. The Subcommittee noted that India was pursuing two paths as part of its satellite navigation programme: the GPS-aided Geostationary Augmented Navigation System (GAGAN) and the Indian Regional Navigation Satellite System, also known as “Navigation with Indian Constellation” (NavIC). GAGAN, a satellite-based augmentation system, provided the increased positioning accuracy required for civil aviation applications. NavIC had been implemented as an independent regional satellite-based navigation service, and the NavIC signal-in-space interface control document had been made available to the public to enable the production of user receivers.

153. The Subcommittee further noted that, in 2021, India had worked on the development of the International Electrotechnical Commission standard for NavIC-based shipborne receiver equipment. It was noted that the NavIC-based safety-of-life alert dissemination system had been in operation for fishermen to provide alerts on impending disasters. India had also developed a distress acknowledgement system using NavIC that would soon be operational.

154. The Subcommittee noted that the Quasi-Zenith Satellite System (QZSS), also known as Michibiki, of Japan was being operated as a four-satellite constellation. QZSS was currently providing three types of services: a service complementing GPS that transmitted ranging signals from satellites; a service that augmented GNSS by providing error corrections through QZSS; and a short messaging service to contribute to disaster risk reduction. It was noted that the QZS-1R satellite, launched in 2021, was conducting an on-orbit test and would be in service in March 2022.

155. The Subcommittee further noted that, in 2021, QZSS had been approved as a component of the Worldwide Radionavigation System of the International Maritime Organization. It was noted that Japan was currently developing a GNSS augmentation service for high-accuracy applications based on a precise point positioning (PPP) technique known as the Multi-GNSS Advanced Demonstration Tool for Orbit and Clock Analysis (MADOCA-PPP), and an early warning service for the Asia and Oceania regions, both of which would be put into operation in 2024.

156. The Subcommittee noted that the Republic of Korea was currently developing a satellite-based augmentation system named the Korea Augmentation Satellite System, and that upon completion of the system in 2022, safety-of-life services would be provided beginning in 2023. It was further noted that the Korea Positioning System, a regional satellite system, would provide a precise positioning, navigation and timing service over the Korean Peninsula. The first satellite was to be launched in 2027, and the positioning, navigation and timing service would be initiated in 2035.

157. The Subcommittee noted with appreciation that Indonesia, Mexico and Pakistan had reported on their projects and activities focused on helping to bring applications of GNSS technology to the widest possible user community.

## VIII. Space weather

158. In accordance with General Assembly resolution [76/76](#), the Subcommittee considered agenda item 11, entitled “Space weather”.

159. The representatives of Australia, Canada, China, France, Germany, India, Indonesia, Iran (Islamic Republic of), Japan, Mexico, the Russian Federation, South Africa, Thailand, the United Kingdom and the United States made statements under agenda item 11. The observers for COSPAR, the Square Kilometre Array Observatory 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.

160. The Subcommittee had before it the following:

(a) 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](#));

(b) Conference room paper entitled “Non-consensus paper of the Expert Group on Space Weather on the survey of the state of Member State preparedness and current and future activities and needs for space weather impact mitigation”, containing the report submitted by the Rapporteur of the Expert Group on Space Weather ([A/AC.105/C.1/2022/CRP.10](#)).

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

(a) “Space weather impact on spacecraft and the upcoming twenty-fifth solar cycle”, by the representative of China;

(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 activities in Slovakia”, by the representative of Slovakia.

162. The Subcommittee noted that space weather, caused by solar variability, was an international concern, owing to its potential negative impact on 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.

163. 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.

164. 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.

165. 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 four global space weather information centres of the International Civil Aviation Organization, which are 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.

166. 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 ([A/74/20](#), annex II), in particular guidelines B.6 and B.7, which addressed the safety of space operations.

167. 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.

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

169. At the 970th meeting of the Subcommittee, on 16 February, the Rapporteur of the Expert Group on Space Weather presented the progress made by the Expert Group during the meetings it had held on the margins of the current session of the Subcommittee.

170. The Expert Group highlighted the set of six high-level recommendations contained in the report entitled “Draft final report of the Expert Group on Space Weather: towards improved international coordination for space weather services” (A/AC.105/C.1/L.401) as a mechanism through which the Subcommittee might advance the goal of improved global resilience against the threat of space weather, with the goal of facilitating the implementation of the space weather-related Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee, namely, guidelines B.6 and B.7. In particular, recommendation 1, on improving communication, cooperation and coordination between key stakeholders in the space weather domain, such as COSPAR, the International Space Environment Service and WMO, was considered important.

171. The Expert Group also noted the conference room paper entitled “Non-consensus paper of the Expert Group on Space Weather on the survey of the state of Member State preparedness, and current and future activities and needs for space weather impact mitigation” (A/AC.105/C.1/2022/CRP.10), which had been updated following further input from States members of the Committee and their experts over the past year to inform and potentially benefit Member States as they continued their work on space weather.

172. The Subcommittee expressed its appreciation for the eight years of work of the Expert Group and endorsed the draft final report and the recommendations contained therein. The Subcommittee agreed to consider the draft final report (A/AC.105/C.1/L.401) as a final report of the Expert Group and to issue the report under the symbol A/AC.105/C.1/122.

## IX. Near-Earth objects

173. In accordance with General Assembly resolution 76/76, the Subcommittee considered agenda item 12, entitled “Near-Earth objects”.

174. The representatives of China, France, Germany, Indonesia, Italy, Japan, Kenya, Mexico, Pakistan, the Russian Federation and the United States made statements under agenda item 12. Statements were also made by the observers for IAWN and SMPAG. During the general exchange of views, statements relating to the item were made by representatives of other member States.

175. The Subcommittee heard a scientific and technical presentation by the representative of Ukraine entitled “Near-Earth space observation activity of Ukraine in 2021”.

176. The Subcommittee heard status reports by IAWN and SMPAG and noted with appreciation the increased international cooperation and efforts being undertaken by them to share information with regard to discovering, monitoring and physically characterizing potentially hazardous near-Earth objects in order to ensure that all nations, in particular developing countries with limited capacity to predict and mitigate the impact of a near-Earth object, were aware of the potential hazard of impact by an asteroid.

177. The Subcommittee noted that some 38.4 million observations of asteroids and comets had been collected in 2021 by the worldwide network of astronomical observatories, based in more than 40 countries. It also noted that the total number of known near-Earth objects came to 28,340 as at 8 February 2022, of which a record number of 3,097 had been discovered in 2021, and that currently a total of 2,263

catalogued asteroids with approximate diameters of 140 m or more had orbits that brought them within 8 million km of Earth's orbit. In that regard, the Subcommittee also noted that, although that number seemed high, it was estimated that only about 41 per cent of the near-Earth objects in that size range had been found.

178. The Subcommittee noted many national efforts and activities aimed at developing capabilities for the discovery, observation, early warning and mitigation of a potentially hazardous near-Earth object and that it was important to strengthen international collaboration and share information. In that regard, the Subcommittee noted the importance of contributing to the work of IAWN and SMPAG.

179. The Subcommittee noted the launch of the first-ever planetary defence technology demonstration mission, the Double Asteroid Redirection Test (DART) of the National Aeronautics and Space Administration (NASA) of the United States, in November 2021, which would demonstrate the kinetic impact deflection technique. In that regard, the Subcommittee noted the international collaboration in that mission, including the contribution by the Italian Space Agency (ASI) of a nanosatellite called the "Light Italian CubeSat for Imaging of Asteroids" (LICIACube) on board the DART mission, and that the mission – humanity's first attempt at altering the motion of a natural celestial body – was drawing on expertise from around the world to evaluate the mission's results using Earth-based telescopes and to enable planning for future planetary defence efforts. The Subcommittee also noted that, as a follow-up, the Hera mission of ESA was planned to encounter the Didymos asteroid system in 2026 to provide a valuable assessment of the deflection technique test of the DART mission.

180. The Subcommittee noted that the IAWN steering committee was holding review meetings generally twice a year, most recently on 8 February in conjunction with the fifty-ninth session of the Subcommittee, and that IAWN continued to grow. There were currently 38 signatories to the IAWN Statement of Intent, representing independent astronomers, observatories and space institutions from Brazil, Canada, Chile, China, Colombia, Croatia, France, Greece, Israel, Italy, Latvia, Mexico, Poland, the Republic of Korea, the Russian Federation, Spain, the United Kingdom and the United States, as well as European international organizations.

181. The Subcommittee noted that the signatories to the IAWN Statement of Intent recognized the importance of collaborative data analysis and of being adequately prepared for communications with a variety of audiences about near-Earth objects, their close approaches to the Earth and Earth impact risks. It was further noted that more information was available on the IAWN website, hosted by the University of Maryland (United States), at <http://iawn.net>.

182. The Subcommittee noted that, in 2021, IAWN had conducted a coordinated campaign to observe a well-known near-Earth asteroid, 2019 XS, in order to evaluate the quality of the technical capabilities of the worldwide observation network and to identify areas for improvement. The observation campaign was coordinated with the IAU Minor Planet Center, with the participation of 69 observatories across the globe. The Subcommittee also noted that preliminary results indicated largely high-quality data from the worldwide network and that the results were expected to be fully analysed and published in a peer-reviewed publication and posted on the IAWN website by the third quarter of 2022.

183. The Subcommittee also noted that, should a credible threat of impact be discovered by the network, the best information available would be provided by IAWN and disseminated to all Member States through the Office for Outer Space Affairs.

184. The Subcommittee noted that, since the previous session of the Subcommittee, SMPAG had held two meetings: its seventeenth meeting, on 13 and 14 October 2021, and its eighteenth meeting, on 9 and 10 February 2022, chaired by ESA and supported by the Office for Outer Space Affairs as the permanent secretariat to SMPAG pursuant to General Assembly resolution 71/90. The Subcommittee was informed of the

progress made in the work of SMPAG, as contained in the summary reports of the meetings (available at <http://smpag.net>).

185. The Subcommittee noted that SMPAG currently had 19 members and 7 permanent observers, with SWF having become the latest new observer to SMPAG. The Subcommittee also noted the application for membership submitted by Brazil. In that regard, the Subcommittee noted that States and their space agencies that were not yet members of SMPAG and were interested in contributing to its work were invited to express such interest in a letter to the Chair of SMPAG, with a copy to the secretariat.

186. The Subcommittee noted that SMPAG, at the meetings held since the previous report, had exchanged information on the ongoing and planned activities of its members related to planetary defence, from both a technical and policy standpoint, and had been briefed, inter alia, on the ongoing sample return missions Hayabusa2 and OSIRIS-REx and on the DART and Hera missions, intended to test the viability and efficiency of a kinetic impactor as a near-Earth object deflection technique.

187. The Subcommittee noted that SMPAG had initiated its first hypothetical impact threat exercise in 2021, under the lead of ASI and the Polytechnic University of Milan, to test the Group's real-world capabilities to support planetary defence in the case of a real threat. The Subcommittee noted that the primary objective of that exercise was to simulate a case of a hypothetical threat caused by an asteroid and to focus on SMPAG procedures to develop coordinated advice for a response to such an impact threat. The exercise would run through 2022 and would include technical aspects related to the design of deflection or reconnaissance missions, as well as tasks related to procedural aspects within SMPAG.

188. The Subcommittee also noted an initiative that built on the unique opportunity presented by a close approach by the asteroid 99942 Apophis in 2029 to look at the possibility of organizing a United Nations-designated international year of asteroid impact hazard awareness in 2029, and that a small working group comprising interested members and observers of IAWN and SMPAG had been set up to work on the proposal.

189. The Subcommittee noted that the seventh International Academy of Astronautics Planetary Defense Conference had been held from 26 to 30 April 2021, hosted by the Office for Outer Space Affairs in cooperation with ESA, and that the eighth Planetary Defense Conference was to be held at the Vienna International Centre in 2023, hosted by the Office in cooperation with its partners and the host country, Austria.

190. The Subcommittee noted that the next meetings of the IAWN steering committee and of SMPAG were planned for September 2022.

## **X. Long-term sustainability of outer space activities**

191. In accordance with General Assembly resolution [76/76](#), the Subcommittee considered agenda item 13, entitled "Long-term sustainability of outer space activities".

192. The representatives of Algeria, Australia, Austria, Brazil, Canada, China, Finland, France, Germany, India, Indonesia, Japan, Luxembourg, Mexico, the Republic of Korea, the Russian Federation, South Africa, Thailand, the United Kingdom, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 13. Statements were also made by the observers for ESA, the Square Kilometre Array Observatory and the Open Lunar Foundation. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

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

- (a) “Space sustainability rating: a voluntary exercise to incentivize operators towards sustainable behaviours in space”, by the representative of Switzerland;
- (b) “Satellites: working towards an equitable and sustainable future”, by the representative of the United States;
- (c) “Managing the plume effect to assure the sustainability of lunar activities”, by the observer for All Moonkind;
- (d) “Capacity-building with the Space Safety Institute”, by the observer for IAASS;
- (e) “International Organization for Standardization activities for the long-term sustainability of space activities”, by the observer for ISO;
- (f) “The Square Kilometre Array Observatory: exploring space in radio frequencies”, by the observer for the Square Kilometre Array Observatory.

194. The Subcommittee had before it the following:

- (a) Working paper by the Chair of the Working Group on the Long-term Sustainability of Outer Space Activities entitled “Draft terms of reference, methods of work and workplan of the Working Group on the Long-term Sustainability of Outer Space Activities” (A/AC.105/C.1/L.400);
- (b) Conference room paper by the Chair of the Working Group on the Long-term Sustainability of Outer Space Activities entitled “Draft terms of reference, methods of work and workplan of the Working Group on the Long-term Sustainability of Outer Space Activities” (A/AC.105/C.1/2022/CRP.13);
- (c) Conference room paper by ESA entitled “Report on the implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities in the European Space Agency” (A/AC.105/C.1/2022/CRP.14/Rev.1);
- (d) Conference room paper by France entitled “General presentation of French activities and views concerning the long-term sustainability of outer space activities, in relation with the implementation of the 21 guidelines (A/74/20, annex II)” (A/AC.105/C.1/2022/CRP.20);
- (e) Conference room paper by the United Kingdom entitled “United Kingdom update on its reporting approach for the voluntary implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities” (A/AC.105/C.1/2022/CRP.22).

195. In accordance with General Assembly resolution 76/76, the Working Group on the Long-term Sustainability of Outer Space Activities was reconvened at the fifty-ninth session of the Subcommittee, with Umamaheswaran R. (India) as Chair.

196. The Subcommittee was informed of a number of measures that had been or were being undertaken to implement the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee (A/74/20, annex II). Those measures included the development of national space policy; the creation, review and updating of relevant domestic legislation; the ratification of relevant international treaties; the enhanced registration of space objects; the requirement that the approval of certain launch activities, namely launch permits and overseas payload permits, include debris mitigation strategies; improvements to government and commercial space situational awareness capabilities to detect, track and identify space objects, including space debris; the development of a monitoring system for objects falling from outer space; the development of a space situational awareness road map; work to replace national space-based space surveillance systems; the issuance of pre-launch notifications; the provision of conjunction analysis support; expanded government-private sector partnerships to increase communication, exchange data and establish best practices for autonomous spacecraft collision avoidance; the design of space missions so as to reduce the length of their presence in protected regions of space; the controlled removal, or repositioning to a graveyard orbit, of launch vehicles and spacecraft that

had completed their operations; research on re-entry modelling; participation in the Inter-Agency Space Debris Coordination Committee; steps taken to protect infrastructure; the development of instruments to incentivize sustainable space activities; national study groups focusing on implementing the Guidelines; the mapping of areas in which more work was needed to better implement the Guidelines; industry outreach, including work with domestic space research and industry sectors to understand their awareness, perspectives and activities related to the implementation of the Guidelines; and close cooperation between space agencies and stakeholders from various backgrounds, including space operators, industry and the scientific community.

197. The Subcommittee was also informed of various initiatives related to the Guidelines for the Long-term Sustainability of Outer Space Activities, including initiatives for their implementation. Those were, among others, the European Union space surveillance and tracking (EU SST) initiative; the Network for Space Object Tracking and Analysis (NETRA) of India; the space safety work of ESA; the prioritization of the safe use of space under the Association of Southeast Asian Nations Subcommittee on Space Technology and Applications; the co-sponsorship of a work item proposal at ISO on space traffic coordination; the issuance, in May 2021, of the notice on promoting the orderly development of microsatellites and strengthening safety management in China; the Unispace Nanosatellite Assembly and Training capacity-building programme of the Indian Space Research Organization (UNNATI); research and capacity-building undertaken through collaboration with APSCO; the capacity-building work of the Asia-Pacific Regional Space Agency Forum; training and capacity-building opportunities offered through the regional centres for space science and technology education, affiliated to the United Nations; the Space Sustainability Rating project, initiated by the World Economic Forum; the second workshop at the European level co-organized by Finland and Switzerland on the implementation of the Guidelines; the project of the Office for Outer Space Affairs entitled “Awareness-raising and capacity-building related to the implementation of the LTS Guidelines”, funded by the United Kingdom; the project of the Office for Outer Space Affairs entitled “Space law for new space actors”, funded by multiple donors, including Belgium, Chile, Japan, Luxembourg, APSCO, the Kyushu Institute of Technology and SWF; a collaboration between the Office for Outer Space Affairs and ESA on a series of infographics and podcasts for social media; and the Consortium for Execution of Rendezvous and Servicing Operations.

198. Some delegations expressed the view that the sharing experience and reviewing best practices and lessons learned in the practical national implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities would enhance overall communication, international cooperation, awareness-raising and capacity-building and would have a positive effect on the space environment.

199. Some delegations expressed the view that the Guidelines for the Long-term Sustainability of Outer Space Activities should promote the safe and sustainable use of outer space, in the interest of all countries, irrespective of their degree of economic or scientific development, without discrimination of any kind and with due regard for the principle of equity, and highlighted the importance of international cooperation and technology transfer as effective means of promoting research programmes and building capacity in countries with emerging space sectors.

200. Some delegations expressed the view that the Working Group on the Long-term Sustainability of Outer Space Activities should swiftly reach consensus on its terms of reference, methods of work and workplan, so as to start its important substantive work during the current session.

201. The view was expressed that as more private actors entered the new space economy, it was critical that States collaborate with private actors to identify challenges to sustainability in order to ensure that all actors act responsibly, with due regard for the impact of their activities, both for the present and for the decades to come.

202. The view was expressed that identifying challenges associated with the implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities and understanding what may be stopping countries from being able to implement the Guidelines, as was being done through interviews in the “Awareness-raising and capacity-building related to the implementation of the LTS Guidelines” project, was critical to understanding what would be needed for future capacity-building activities.

203. The view was expressed that the approach to implementing the Guidelines for the Long-term Sustainability of Outer Space Activities depended not only on a nation’s level of technical development, but also on its political will. It was important that the methods and means applied not harm the interests of other space actors.

204. The view was expressed that the evolving framework on the long-term sustainability of outer space activities must not impose undue or unreasonably high standards and obligations, which might be prejudicial to the interests of developing countries and nations with emerging space programmes.

205. The view was expressed that the route to guaranteeing the long-term sustainability of outer space activities was through the creation of binding rules, as the existing legal framework was proving to be inadequate.

206. The view was expressed that the Scientific and Technical Subcommittee was an indispensable forum for the exchange of views on scientific and technical aspects of outer space activities and for fostering international cooperation for the peaceful exploration and the safe, sustainable intergenerational use of outer space.

207. The view was expressed that scientific, technical, legal and policy aspects were all relevant to the safety and sustainability of space activities and that there should therefore be close exchange on the topic between the Scientific and Technical Subcommittee and the Legal Subcommittee.

208. At its 970th meeting, on 16 February, the Scientific and Technical Subcommittee endorsed the report of the Working Group, as contained in annex II to the present report.

209. At the same meeting, the Subcommittee endorsed the terms of reference, methods of work and workplan of the Working Group, as contained in the appendix to annex II to the present report.

## **XI. Future role and method of work of the Committee**

210. In accordance with General Assembly resolution [76/76](#), the Subcommittee considered agenda item 14, entitled “Future role and method of work of the Committee”.

211. The representatives of China, Japan, the Netherlands, the Russian Federation and the United Kingdom made statements under agenda item 14. During the general exchange of views, statements relating to the item were made by representatives of other member States.

212. The Subcommittee had before it the note by the Secretariat on the governance and method of work of the Committee and its subsidiary bodies ([A/AC.105/C.1/L.384](#)).

213. The Subcommittee noted that the Committee and its Subcommittees served as a unique platform for international cooperation in the peaceful uses of outer space.

214. The view was expressed that the Committee should strengthen its interaction with relevant international organizations through appropriate means to increase the awareness of Member States of the relevant processes and to prevent the fragmentation of global governance in outer space.

215. Some delegations expressed the view that the discussion of important topics on the space agenda should be carried out in the framework of the Committee and that transferring such discussions to parallel platforms would have a negative effect on the role of the Committee.

216. The view was expressed that the Committee should focus exclusively on promoting the peaceful uses of outer space, while matters of preventing escalation and conflict that could arise from the use of weapons against space systems should be dealt with in the United Nations disarmament platforms.

217. The view was expressed that it was important to further strengthen the intergovernmental status of the Committee and that a dialogue with commercial operators and scientific and academic circles should be conducted in such a way as to avoid any form of interference in the work of the Committee.

218. The view was expressed that the Committee should consider new and innovative ways to best engage relevant stakeholders, such as industry, academia and civil society actors, in its activities.

219. The view was expressed that the Committee should be more proactive in responding to emerging challenges, including issues such as satellite megaconstellations in low Earth orbits, the impact of private business activities on outer space governance and the sustainable development of space technology services.

220. The view was expressed that new items should be added to the agenda of the Committee and its Subcommittees only when other items were removed from the agenda.

221. The view was expressed that all countries should be able to participate in the work of the Committee and that there should be no politicization of participation in the work of the Committee.

222. The view was expressed that States members of the Committee should strictly follow the existing procedures and rules while participating in international mechanisms established under the auspices of the Committee, including by refraining from blocking consensus on matters such as the admission of new members to ICG without valid reasons.

223. The view was expressed that qualified international, regional and non-governmental organizations with permanent observer status with the Committee should abide by recognized international law and norms of international relations.

## **XII. Use of nuclear power sources in outer space**

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

225. 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.

226. 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.

227. Some delegations expressed the view that nuclear power had opened the solar system to exploration, making it possible to observe and understand dark, distant planetary bodies that would otherwise be unreachable. Similarly, the use of nuclear

power sources for the in-space propulsion of spacecraft was a potential technology for crew and cargo missions to Mars and scientific missions to the outer solar system, enabling faster and more robust human and robotic missions.

228. 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.

229. 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”.

230. 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.

231. 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.

232. The view was expressed that, in view of the ambitious plans for human 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.

233. 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.

234. Some delegations expressed the view 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.

235. 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.

236. 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.

237. The Working Group on the Use of Nuclear Power Sources in Outer Space held four meetings. The Subcommittee, at its 970th meeting, on 16 February, endorsed the report of the Working Group, which is contained in annex III to the present report.

### XIII. Space and global health

238. In accordance with General Assembly resolution 76/76, the Subcommittee considered agenda item 16, entitled “Space and global health”.

239. The representatives of China, India, Indonesia, Japan, Switzerland, Thailand and the United States made statements under agenda item 16. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

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

(a) “Role of space technologies in public health crisis management”, by the representative of Australia;

(b) “‘Space2Health’: technology and knowledge transfer at the intersection of space and health”, by the representative of Germany;

(c) “Space dosimetry: Hungarian innovations”, by the representative of Hungary;

(d) “Anaerobic bioreactors for refugee health and long-duration space missions”, by the observer for SGAC.

241. The Subcommittee had before it the following:

(a) Draft resolution on space and global health (A/AC.105/C.1/L.402);

(b) Draft report of the Working Group on Space and Global Health on the work conducted under its multi-year workplan (A/AC.105/C.1/L.403);

(c) Conference room paper containing a proposal by the Chair of the Working Group on Space and Global Health regarding the establishment of a space and global health network to support and sustain the implementation of the recommended space and global health platform (A/AC.105/C.1/2022/CRP.12);

(d) Conference room paper containing a note by the Secretariat entitled “Draft General Assembly resolution on space and global health” (A/AC.105/C.1/2022/CRP.21).

242. The Subcommittee noted a broad array of activities relevant to space and global health in areas such as telemedicine, space life sciences, space technologies, tele-epidemiology and disaster management (including responses to epidemics), as well as activities undertaken through space-based research, including at the International Space Station.

243. The Subcommittee acknowledged the contribution of space science, space technology and space applications to the prevention and control of diseases, the promotion of human health and welfare, the addressing of global health issues, the advancement of medical research, the advancement of health practices and the provision of health-care services to individuals and communities, including in rural areas with limited access to health care.

244. The Subcommittee noted with concern the extraordinary situation, with global implications, created by the COVID-19 pandemic, which had affected, inter alia, societies and their health, the economy, tourism, sports and culture in an unprecedented way, and encouraged the international community to embrace a One Health approach.

245. The Subcommittee noted the vital role of space science, space technology and space applications in addressing the COVID-19 pandemic, and their critical role in supporting contact tracing, the identification of affected areas, modelling the spread of the disease and monitoring its transmission, connectivity for remote working, telehealth, communications, and methods for coping with social isolation.

246. Some delegations expressed the view that it was necessary to strengthen research on the use of space observations in order to better understand the emissions, trends and impacts on human health of air pollutants such as particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) and ozone.

247. The view was expressed that the availability and accuracy of space-based data, supplemented by ground-based observations, should be improved, and that those data should be accessible to a wide range of stakeholders.

248. Pursuant to paragraph 11 of General Assembly resolution [76/76](#), the Subcommittee, at its 955th meeting, on 7 February, reconvened its Working Group on Space and Global Health, with Antoine Geissbühler (Switzerland) as Chair.

249. At its 970th meeting, on 16 February, the Subcommittee endorsed the report of the Working Group on Space and Global Health, including the recommended actions contained therein, which is contained in annex IV to the present report.

#### **XIV. 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**

250. In accordance with General Assembly resolution [76/76](#), the Subcommittee considered agenda item 17, entitled “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”, as a single issue/item for discussion.

251. The representatives of Algeria, Canada, China, India, Indonesia, Iran (Islamic Republic of), Pakistan, the Russian Federation, South Africa, the United Kingdom and the United States made statements under agenda item 17. The observer for ITU

also made a statement. During the general exchange of views, statements relating to the item were made by representatives of other member States.

252. In accordance with the invitation extended by the Subcommittee at its fifty-eighth session, in 2021 (A/AC.105/1240, para. 259), the observer for ITU presented a report concerning the contribution of ITU to the peaceful uses of outer space, including the use of the geostationary satellite orbit and other orbits. In that connection, the Subcommittee took note with appreciation of the information provided in the annual report for 2021 of the Radiocommunication Bureau of ITU on the use of the geostationary satellite orbit and other orbits,<sup>1</sup> as well as other documents referred to in conference room paper A/AC.105/C.1/2022/CRP.18. The Subcommittee invited ITU to continue to submit reports to it.

253. Some delegations expressed the view that the geostationary orbit was a limited natural resource that was at risk of becoming saturated, thereby threatening the sustainability of space activities in that environment, that its exploitation should be rationalized and that it should be made available to all States, under equitable conditions, irrespective of their current technical capabilities, taking into particular account the needs of developing countries and the geographical location of certain countries. Those delegations were also of the view that it was important to use the geostationary orbit in compliance with international law, in accordance with the decisions of ITU and within the legal framework established in the relevant United Nations treaties.

254. Some delegations expressed the view that the geostationary orbit was an integral part of outer space and possessed strategic and economic value for States, and that it should be used in a rational, balanced, efficient and equitable manner so as to ensure that it would not become saturated. The delegations expressing that view were also of the view that, in the interests of developing countries, and equatorial countries in particular, the geostationary orbit should be regulated under a special legal framework or sui generis regime, in line with article 44 of the ITU Constitution.

255. Some delegations expressed the view that the utilization by States of the geostationary orbit on a “first come, first served” basis was unacceptable and that the Subcommittee, with the involvement of ITU, should therefore develop a regime guaranteeing States equitable access to orbital positions.

256. The view was expressed that the issue of equitable access to the geostationary orbit was a matter that should be coordinated between the Scientific and Technical Subcommittee and the Legal Subcommittee. The delegation expressing that view recalled conference room paper A/AC.105/C.1/2021/CRP.26, submitted to the Scientific and Technical Subcommittee at its fifty-eighth session to that effect. The delegation expressing that view was also of the view that ITU aimed to provide equitable access to the geostationary orbit by establishing permanent orbital and frequency resources, called plan assignments, for all Member States. As many of those assignments had become unusable over time owing to the lack of proper regulations for long-term protection, the delegation expressing that view was also of the view that ITU should include in its annual report an additional section dedicated to the topic of equitable access to orbital and frequency resources, which would include a summary of the progress of the relevant discussions at ITU.

257. Some delegations expressed the view that, while megaconstellations of satellites would bring about new approaches to the establishment of nationwide telecommunication networks, for some States, geostationary satellites would continue to be irreplaceable, owing to the special geographical conditions for which they were used, and hence there was a need to preserve the geostationary orbit region. The active development of such megaconstellations would create a number of significant problems, such as radio frequency interference and overpopulation of orbits, and thus

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<sup>1</sup> See [www.itu.int/en/ITU-R/space/snl/Pages/reportSTS.aspx](http://www.itu.int/en/ITU-R/space/snl/Pages/reportSTS.aspx).

the matter should be expediently addressed by States, within both ITU and the Subcommittee.

258. Some delegations expressed the view that spectrum and geostationary orbit slot allocation was a subject within the remit of ITU.

259. The view was expressed that satellite services played a key role in a range of telecommunications links, such as fixed-to-fixed connections (e.g. between emergency response headquarters and the field), fixed-to-mobile connections (e.g. between emergency response headquarters and mobile response units), mobile-to-mobile and point-to-multipoint connections (e.g. for the dissemination of essential information to the population). In addition, satellite networks could provide direct connectivity to remote areas, provide a quick and convenient solution for emergency response or rescue teams in the short term and enable interoperability between user groups and between different systems and networks. The delegation expressing that view was of the view that it was important that States, operators of satellite telecommunications systems, humanitarian organizations, non-governmental organizations and researchers were aware of the importance to be attached to that issue, and that therefore an analysis of the matter should be made by the Subcommittee, without prejudice to the role of ITU.

260. The view was expressed that the spread of the COVID-19 pandemic had severely affected the satellite programmes of developing countries in the past two years, which could result in the loss of their rights, as administered by ITU, to the geostationary orbit. If extensions of rights to the geostationary orbit were not granted, that might have serious effects on the development, through satellite technology, of information and communications technology infrastructure in developing countries. The delegation expressing that view was therefore of the view that international bodies should assist developing countries to the maximum extent possible.

261. Some delegations expressed the view that, in order to ensure the sustainability of the geostationary orbit, as well as to ensure equitable access to the geostationary orbit based on the needs of all nations, taking into particular account the needs and interests of developing countries, it was necessary to keep those issues on the agenda of the Subcommittee.

## **XV. General exchange of views on dark and quiet skies for science and society**

262. At its 955th meeting, on 7 February, the Subcommittee agreed to include item 18, 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 the fifty-ninth session of the Subcommittee.

263. The representatives of Algeria, Australia, Austria, Chile, Czechia, France, Germany, Indonesia, Italy, the Russian Federation, South Africa, Spain, Turkey, the United Kingdom and the United States made statements under agenda item 18. The observers for IAU and the Square Kilometre Array Observatory also made statements under the item. During the general exchange of views, statements relating to the item were made by representatives of other member States.

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

(a) “Dark and quiet skies in Australia: mitigating the impacts of terrestrial artificial light at night and radio frequency interference”, by the representative of Australia;

(b) “Tidal disruption events in the SRG/eROSITA all-sky X-ray survey”, by the representative of the Russian Federation.

265. The Subcommittee had before it the following:

(a) Report on the United Nations/Spain/IAU Conference on Dark and Quiet Skies for Science and Society ([A/AC.105/1255](#));

(b) Note by the Secretariat containing a summary of discussions on dark and quiet skies for science and society ([A/AC.105/1257](#));

(c) Working paper entitled “Protection of dark and quiet skies”, prepared by Austria, Chile, the Dominican Republic, Slovakia, Spain, IAU, ESO and the Square Kilometre Array Observatory ([A/AC.105/C.1/L.396](#)).

266. The Subcommittee noted that, as an ever-increasing number of stakeholders, including private entities, were launching spacecraft into orbit, concerns had been raised about spacecraft that reflected sunlight into astronomical telescopes or crossed their field of view, thereby degrading astronomical observations.

267. Some delegations expressed the view that astronomical observations for both optical and radio astronomy were an essential aspect of space activities and should be protected from interference. Astronomical observations from space and Earth-based installations supported the ability to understand the universe, enabled deep space navigation and exploration and provided early warning detection of near-Earth objects. Some regions had already established practices to preserve the darkness of the sky. The delegations expressing that view encouraged States to follow the examples of those that had implemented regulatory actions to protect astronomy from artificial light at night in defined areas. Mitigation measures against interference from satellite constellations had been implemented by industry in some cases, especially when it had been possible to engage with astronomers early in the project cycle. In addition, astronomers were devising other ways to reduce the impact of constellations.

268. Some delegations welcomed the review by the astronomy community and the space sector of the feasibility of implementing the measures outlined, and welcomed mutual policy coherence with space debris mitigation considerations.

269. The view was expressed that some States provided a legal and regulatory framework enabling private operators to launch large satellite constellations, despite the risks that such constellations might have an impact on astronomical observations, the safety of space operations and space debris mitigation.

270. The view was expressed that the deployment of large satellite constellations could have a number of negative consequences, which were far from being limited to the impact on astronomical observations. In that regard, it was important to ensure non-interference with the information sovereignty of States when implementing projects to provide Internet access services.

271. The view was expressed that there would need to be trade-offs between the needs of the astronomical community and the needs of orbital operators.

272. The view was expressed that collaboration between the satellite industry and astronomers had led to concrete recommendations and that a set of best practice guidelines, which included modifying orbital altitudes, voluntary changes to satellite designs, the provision of telemetry information for astronomical observations and the modification of satellite orientation in orbit-raising and -lowering procedures to minimize the reflected light produced by satellites, could be voluntarily included in satellite design and development.

273. Some delegations welcomed the initiative taken by IAU in inviting delegations to engage with its recently opened Centre for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference.

274. Some delegations expressed the view that some of the issues relating to the topic of dark and quiet skies were matters to be addressed by ITU.

275. The view was expressed that issues identified in relation to artificial light at night would be best discussed at the national level.

276. Some delegations expressed the view that, owing to the rapid evolution in launches of satellite constellations, the ongoing exchange of views on dark and quiet skies should continue to take place in the Subcommittee, with an agenda item on dark and quiet skies for science and society to be included in future sessions of the Subcommittee.

## **XVI. Draft provisional agenda for the sixtieth session of the Scientific and Technical Subcommittee**

277. In accordance with General Assembly resolution 76/76 and the decision of the Subcommittee at its 955th meeting, on 7 February, the Subcommittee considered agenda item 19, entitled “Draft provisional agenda for the sixtieth session of the Scientific and Technical Subcommittee”.

278. The representatives of Chile and Spain made statements under agenda item 19. During the general exchange of views, statements relating to the item were made by representatives of other member States.

279. The Subcommittee noted that the Secretariat had scheduled its sixtieth session to be held from 6 to 17 February 2023.

280. The Subcommittee agreed that the following items would be proposed to the Committee for inclusion in the agenda of the Subcommittee at its sixtieth session:

1. Adoption of the agenda.
2. Statement by the Chair.
3. General exchange of views and introduction of reports submitted on national activities.
4. United Nations Programme on Space Applications.
5. Space technology for sustainable socioeconomic development.
6. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth’s environment.
7. Space debris.
8. Space-system-based disaster management support.
9. Recent developments in global navigation satellite systems.
10. Space weather.
11. Near-Earth objects.
12. Long-term sustainability of outer space activities.  
(Work for 2023 as reflected in the multi-year workplan of the Working Group on the Long-term Sustainability of Outer Space Activities (see para. 209 above and para. 18 of the appendix to annex II))
13. Future role and method of work of the Committee.
14. Space and global health.
15. Use of nuclear power sources in outer space.  
(Work for 2023 as reflected in the extended multi-year workplan of the Working Group on the Use of Nuclear Power Sources in Outer Space (see para. 237 above and annex III, para. 5))
16. 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

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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.

(Single issue/item for discussion)

17. General exchange of views on dark and quiet skies for science and society.

(Single issue/item for discussion)

18. Draft provisional agenda for the sixty-first session of the Scientific and Technical Subcommittee.

19. Report to the Committee on the Peaceful Uses of Outer Space.

281. The Subcommittee noted that, in accordance with the agreement that it had reached at its forty-fourth session, in 2007 ([A/AC.105/890](#), annex I, para. 24), the symposium at the sixty-first session of the Subcommittee, in 2023, was to be organized by COSPAR, and that the topic of the symposium would be proposed to and decided upon by the Committee at its sixty-fifth session, to be held from 1 to 10 June 2022.

## Annex I

### Report of the Working Group of the Whole

1. In accordance with paragraph 11 of General Assembly resolution [76/76](#), the Scientific and Technical Subcommittee, at its fifty-ninth session, reconvened its Working Group of the Whole.
2. From 9 to 17 February 2022, the Working Group held three meetings, with Prakash Chauhan (India) as Chair.
3. The Working Group considered the following items:
  - (a) Space technology for sustainable socioeconomic development;
  - (b) Future role and method of work of the Committee;
  - (c) Draft provisional agenda for the sixtieth session of the Scientific and Technical Subcommittee.
4. The Working Group had before it the note by the Secretariat entitled “Governance and method of work of the Committee on the Peaceful Uses of Outer Space and its subsidiary bodies” ([A/AC.105/C.1/L.384](#)).
5. The Working Group recommended that the multi-year workplan on the governance and method of work of the Committee and its subsidiary bodies, as contained in paragraph 2 of document [A/AC.105/C.1/L.384](#), be extended until 2023.
6. The Working Group agreed that the Secretariat should update document [A/AC.105/C.1/L.384](#) for further consideration at the sixtieth session of the Subcommittee, in 2023, and that those updates should include the considerations made by the Committee and its Subcommittees until 2022.
7. The Working Group noted that, in accordance with General Assembly resolution [76/76](#), the Scientific and Technical Subcommittee would submit to the Committee its proposal for the draft provisional agenda for the sixtieth session of the Subcommittee, to be held in 2023. The Working Group agreed that the draft provisional agenda was to be considered by the Subcommittee under item 19 of its agenda.
8. At its 3rd meeting, on 17 February, the Working Group adopted the present report.

## Annex II

### Report of the Working Group on the Long-term Sustainability of Outer Space Activities

1. In accordance with paragraph 11 of General Assembly resolution [76/76](#), the Scientific and Technical Subcommittee, at its fifty-ninth session, reconvened its Working Group on the Long-term Sustainability of Outer Space Activities.
2. The Working Group held meetings from 8 to 16 February 2022, with Umamaheswaran R. (India) as Chair.
3. In addition to the meetings that the Working Group held with the benefit of interpretation services during the present session, it also held informal meetings on the margins of the session.
4. The Working Group had before it the following:
  - (a) Working paper by the Chair of the Working Group entitled “Draft terms of reference, methods of work and workplan of the Working Group on the Long-term Sustainability of Outer Space Activities” ([A/AC.105/C.1/L.400](#));
  - (b) Conference room paper by the Chair of the Working Group entitled “Draft terms of reference, methods of work and workplan of the Working Group on the Long-term Sustainability of Outer Space Activities” ([A/AC.105/C.1/2022/CRP.13](#));
  - (c) Conference room paper by the European Space Agency entitled “Report on the implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities in the European Space Agency” ([A/AC.105/C.1/2022/CRP.14/Rev.1](#));
  - (d) Conference room paper by France entitled “General presentation of French activities and views concerning the long-term sustainability of outer space activities, in relation with the implementation of the 21 guidelines ([A/74/20](#), annex II)” ([A/AC.105/C.1/2022/CRP.20](#));
  - (e) Conference room paper by the United Kingdom entitled “United Kingdom update on its reporting approach for the voluntary implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities” ([A/AC.105/C.1/2022/CRP.22](#)).
5. The Working Group recalled that the Committee on the Peaceful Uses of Outer Space, at its sixty-second session, in June 2019, had adopted the Guidelines for the Long-term Sustainability of Outer Space Activities ([A/74/20](#), para. 163 and annex II), had decided to establish, under a five-year workplan, a working group under the agenda item on the long-term sustainability of outer space activities of the Subcommittee ([A/74/20](#), para. 165) and had also decided that the working group would agree on its own terms of reference, methods of work and dedicated workplan ([A/74/20](#), para. 167).
6. The Working Group also recalled that it had been convened during the fifty-eighth session of the Subcommittee, in April 2021 ([A/AC.105/1240](#), para. 195), had met during the sixty-fourth session of the Committee, in August and September 2021 ([A/76/20](#), para. 121), had held online informal consultations from 22 to 24 November 2021 and had held an intersessional meeting on 3 and 4 February 2022, just prior to the fifty-ninth session of the Subcommittee.
7. On 16 February, the Working Group agreed on and adopted its terms of reference, methods of work and workplan, as contained in the appendix to the present report.
8. The Working Group also agreed that the Chair, with the support of the Secretariat, would, following the fifty-ninth session of the Subcommittee, invite States members of the Committee, organizations having permanent observer status with the Committee and relevant United Nations entities, subject to the relevant

provisions of paragraphs 15 and 16 of the terms of reference, methods of work and workplan, to provide information and views on the topics in paragraphs 4 and 6 of the terms of reference, methods of work and workplan, requesting input in a format deemed appropriate.

9. The Working Group further agreed to hold informal consultations, in a hybrid format, in November 2022.
10. On 16 February, the Working Group considered and adopted the present report.

## Appendix

### **Terms of reference, methods of work and workplan of the Working Group on the Long-term Sustainability of Outer Space Activities**

#### **I. Introduction**

1. At its sixty-second session, in 2019, the Committee on the Peaceful Uses of Outer Space adopted the Guidelines for the Long-term Sustainability of Outer Space Activities (A/74/20, annex II). The Committee encouraged States and international intergovernmental organizations to voluntarily take measures to ensure that the Guidelines were implemented to the greatest extent feasible and practicable (A/74/20, para. 163).

2. The Committee noted that it should serve as the principal forum for continued institutionalized dialogue on issues related to the implementation and review of the Guidelines (A/74/20, para. 164).

3. At the same session, the Committee decided to establish, under a five-year workplan, a working group under the agenda item on the long-term sustainability of outer space activities of the Scientific and Technical Subcommittee (A/74/20, para. 165).

4. The Committee also decided that the working group would agree on its own terms of reference, methods of work and dedicated workplan, and that the working group would be guided by the following framework (A/74/20, para. 167):

(a) Identifying and studying challenges and considering possible new guidelines for the long-term sustainability of outer space activities. This could be done by taking into consideration existing documents, including, inter alia, documents A/AC.105/C.1/L.367 and A/AC.105/2019/CRP.16;

(b) Sharing experiences, practices and lessons learned from voluntary national implementation of the adopted Guidelines;

(c) Raising awareness and building capacity, in particular among emerging space nations and developing countries.

5. At its fifty-eighth session, in 2021, the Scientific and Technical Subcommittee elected Umamaheswaran R. (India) as Chair of the Working Group on the Long-term Sustainability of Outer Space Activities and convened the Working Group (A/AC.105/1240, para. 195).

#### **II. Terms of reference**

6. The Working Group will be guided by the framework defined in the report of the Committee on the Peaceful Uses of Outer Space on its sixty-second session (A/74/20, para. 167), which comprises the following:

(a) Identifying and studying challenges and considering possible new guidelines for the long-term sustainability of outer space activities. This could be done by taking into consideration existing documents, including, inter alia, documents A/AC.105/C.1/L.367 and A/AC.105/2019/CRP.16;

(b) Sharing experiences, practices and lessons learned from voluntary national implementation of the adopted Guidelines;

(c) Raising awareness and building capacity, in particular among emerging space nations and developing countries.

7. The Working Group will attach equal importance to each of the three elements of the guiding framework set out in paragraph 6 above.
8. The Working Group will take as its legal framework the existing United Nations treaties and principles governing the activities of States in the exploration and use of outer space.
9. The Working Group will produce a thorough report on the long-term sustainability of outer space activities, containing the following:
  - (a) Information on the identification and study of challenges, and corresponding recommendations, as well as possible new guidelines for the long-term sustainability of outer space activities;
  - (b) Information on experiences, practices and lessons learned from voluntary implementation of the adopted Guidelines and recommendations for their further practical implementation;
  - (c) Information on and recommendations for capacity-building and awareness-raising activities, including those related to improving international cooperation in capacity-building, taking into particular consideration the requirements of emerging space nations and developing countries;
  - (d) Recommendations on future activities and work.

### **III. Methods of work**

10. The Working Group, led by the Chair and assisted by the Secretariat, is to be guided in its work by the rules of procedure, methods of work and established practices of the Committee on the Peaceful Uses of Outer Space. The Working Group makes decisions by consensus and reports to the Scientific and Technical Subcommittee. The Working Group will meet during the annual sessions of the Scientific and Technical Subcommittee, with the benefit of interpretation services, and may request that time be granted to meet during the sessions of the Committee on the Peaceful Uses of Outer Space.
11. The Working Group may request the Scientific and Technical Subcommittee to coordinate with the Legal Subcommittee on legal questions.
12. The Working Group may decide, on an exceptional basis, to meet in the intersessional periods to advance its work. The scheduling of any such meetings will be agreed by the member States in advance at the formal sessions and may include opportunities to participate online, if possible, so as to encourage maximum participation.
13. The Working Group will structure its discussions in a sequential, non-simultaneous and balanced manner under the leadership of the Chair, giving equal importance and an equitable amount of time to each of the three elements of the guiding framework.
14. The Working Group will invite contributions from States members of the Committee for further discussion at its meetings.
15. The Chair of the Working Group, with the support of the Secretariat, will establish and maintain a list of points of contact for each member State and permanent observer to facilitate faster and more effective dissemination of information, in addition to continuing to use formal means of communication.
16. The Working Group will be open to all States members of the Committee. International intergovernmental organizations holding permanent observer status will participate in accordance with the relevant General Assembly resolutions. As the Working Group is intergovernmental in nature, it may decide, in accordance with the established practices of the Committee, to invite contributions of information from international organizations and non-governmental entities, including from academia,

industry and the private sector, and those contributions will be coordinated through the identified national points of contact. To that end, workshops may be held during sessions and/or intersessional periods.

17. The formal documents of the Working Group will be made available in the six official languages of the United Nations.

#### **IV. Multi-year workplan**

18. The five-year workplan of the Working Group for the period 2022–2026 is as follows:

##### **2022**

Adoption of the terms of reference, methods of work and dedicated workplan for the Working Group.

Identify points of contact for each member State and permanent observer.

The Chair, in consultation with the Working Group, is to invite States members of the Committee, organizations having permanent observer status with the Committee and relevant United Nations entities, subject to the relevant provisions of paragraphs 15 and 16 above, to provide information and views on the topics in paragraphs 4 and 6 above, by requesting inputs in a format deemed appropriate.

##### **2023**

Information and views are to continue to be submitted, as in 2022.

The Chair and the Secretariat are to compile information received and the Working Group is to start consultations and exchanges thereon, with the goal of developing recommendations as outlined in paragraphs 4, 6 and 9.

An agenda is to be developed for the workshop to be held in 2024.

##### **2024**

The Chair is to present an updated draft compilation of the information and views received, for the consideration of the Working Group, at the sixty-first session of the Scientific and Technical Subcommittee.

The Working Group is to start developing recommendations and to continue consultations and exchanges, as outlined in paragraphs 4, 6 and 9.

A workshop is to be held, within existing resources, on the margins of the sixty-first session of the Scientific and Technical Subcommittee, with the agenda to be defined in 2023, on the topics in paragraphs 4 and 6 above, with inputs from national governmental organizations, international intergovernmental organizations, non-governmental organizations, the private sector and academia.

A report on the workshop is to be prepared by the Chair with the support of the Secretariat.

Member States may organize additional technical workshops and/or technical meetings, including at the regional and international levels, and provide the outcome of those technical workshops/technical meetings to the Working Group for its consideration.

The Chair is to prepare a draft report, taking into account the work of the Working Group.

**2025**

The Chair is to present the updated draft report, for the consideration of the Working Group, at the sixty-second session of the Scientific and Technical Subcommittee.

The Working Group will:

- (a) Review the draft report;
- (b) Consider any additional information and views provided;
- (c) Continue the development of a thorough report, which contains all the elements of paragraph 9, and of recommendations, in accordance with paragraphs 4 and 6 above, with a view to consolidating them and enabling the Chair to prepare a draft final report of the Working Group.

**2026**

The draft final report of the Working Group is to be finalized and presented to the Scientific and Technical Subcommittee at its sixty-third session, to include the following:

- (a) Information on the identification and study of challenges, and corresponding recommendations, as well as possible new guidelines for the long-term sustainability of outer space activities;
- (b) Information on experiences, practices and lessons learned from voluntary implementation of the adopted Guidelines and recommendations for their further practical implementation;
- (c) Information on and recommendations for capacity-building and awareness-raising activities, including those related to improving international cooperation in capacity-building, taking into particular consideration the requirements of emerging space nations and developing countries;
- (d) Recommendations on future activities and work.

## Annex III

### Report of the Working Group on the Use of Nuclear Power Sources in Outer Space

1. In accordance with paragraph 11 of General Assembly resolution [76/76](#), the Scientific and Technical Subcommittee, at its 955th meeting, on 7 February 2022, reconvened its Working Group on the Use of Nuclear Power Sources in Outer Space, with Sam A. Harbison (United Kingdom of Great Britain and Northern Ireland) as Chair.

2. The Working Group continued its work under the extended multi-year workplan ([A/AC.105/1240](#), para. 246 and annex II, para. 5) and recalled the following objectives of its multi-year workplan ([A/AC.105/1138](#), annex II, paras. 8 and 9):

Objective 1. Promote and facilitate the implementation of the Safety Framework for Nuclear Power Source Applications in Outer Space by:

(a) Providing an opportunity for member States and international intergovernmental organizations considering or initiating involvement in space nuclear power source (NPS) applications to summarize and discuss their plans, progress to date and any challenges faced or foreseen in implementing the Safety Framework;

(b) Providing an opportunity for member States and international intergovernmental organizations with experience in space NPS applications to make presentations on challenges identified under subparagraph (a) above, and on their mission-specific experiences in implementing the guidance contained in the Safety Framework.

Objective 2. Discuss within the Working Group advances in knowledge and practices and their potential for enhancing the technical content and scope of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space through presentations from member States and international intergovernmental organizations based on one or more of the following:

(a) Their practical experience in implementing the Principles;

(b) Their knowledge of advances in science and technology relating to space NPS;

(c) Their knowledge of internationally accepted norms, standards and practices regarding radiation protection and nuclear safety.

3. The Working Group had before it the following documents:

(a) Draft report on the implementation of the Safety Framework for Nuclear Power Source Applications in Outer Space and recommendations for potential enhancements of the technical content and scope of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space, prepared by the Working Group on the Use of Nuclear Power Sources in Outer Space ([A/AC.105/C.1/L.391](#));

(b) Working paper entitled “Reflections on further steps to enhance the safety of nuclear power source applications in outer space”, prepared by the United Kingdom and the European Space Agency ([A/AC.105/C.1/L.395](#)).

4. The Working Group met in both informal and formal meetings during the fifty-ninth session of the Scientific and Technical Subcommittee to discuss the documents before it, as referred to in paragraph 3 above, and recalled that during 2021 it had held three intersessional meetings online to meet the objectives of the workplan for that year and had been able to make some progress in developing a draft report to the Subcommittee on the outcome of its work under the current workplan, while also considering the possibility that the workplan might need to be extended.

5. On the basis of its deliberations during 2021, as well as at the formal and informal meetings during the current session, the Working Group agreed that more discussions and work were needed in order to complete its final report to the Subcommittee and to explore options for gathering information about advances in knowledge, practices and plans for future space nuclear power source applications. Therefore, the Working Group recommended that the current multi-year workplan be extended to 2023 as follows:

2023 Finalize the report to the Subcommittee on the outcome of the multi-year workplan and explore options for gathering information about advances in knowledge, practices and plans for future space nuclear power source applications.

6. The Working Group agreed that, should the workplan be extended, a series of intersessional meetings would be necessary. In that connection, the Working Group requested the Secretariat to facilitate the scheduling, preparation and holding of those meetings. Furthermore, the Working Group felt that it would be highly desirable to hold a meeting on the margins of the sixty-fifth session of the Committee on the Peaceful Uses of Outer Space, to be held from 1 to 10 June 2022.

7. The Working Group also agreed that the Secretariat should, under the guidance of the Chair of the Working Group, update the contents of the website of the Office for Outer Space Affairs dedicated to the work of the Working Group ([www.unoosa.org/oosa/en/COPUOS/stsc/wgnps/index.html](http://www.unoosa.org/oosa/en/COPUOS/stsc/wgnps/index.html)).

8. At its 4th meeting, on 16 February, the Working Group adopted the present report.

## Annex IV

### Report of the Working Group on Space and Global Health

1. In accordance with paragraph 11 of General Assembly resolution 76/76, the Scientific and Technical Subcommittee, at its fifty-ninth session, reconvened its Working Group on Space and Global Health.
2. From 9 to 16 February 2022, the Working Group held four meetings, with Antoine Geissbühler (Switzerland) as Chair.
3. The Working Group had before it the documents listed in paragraph 241 of the report of the Subcommittee on its fifty-ninth session.
4. The Working Group noted that, in addition to the meetings that the Working Group had held with the benefit of interpretation services during the current session of the Subcommittee, the Chair and interested delegations had held scheduled informal consultations on 8 and 11 February 2022.
5. The Working Group recalled the following activities for 2022 under its multi-year workplan for the period 2019–2022, adopted by the Subcommittee at its fifty-sixth session, in 2019 (A/AC.105/1202, annex III, appendix I, para. 9):
  - (a) Review and finalize the report of the Working Group to the Subcommittee, and review and finalize a draft resolution, to be considered for endorsement by the Committee with a view to its adoption by the General Assembly;
  - (b) Determine whether the workplan should be extended to cover potential future work. If the workplan is not extended, discontinue the Working Group.
6. The Working Group noted that the following two intersessional meetings were held to advance the work on the globally accessible space and global health platform and to prepare the activities scheduled for the final year of the workplan of the Working Group:
  - (a) The first intersessional meeting, which took the form of a workshop on knowledge management and sharing, was held in an online format on 15 June 2021 and had the following objectives: to share existing practices and experiences in collaborative knowledge management in the domain of space and health, and to present and discuss a set of usage scenarios to be implemented on the platform;
  - (b) The second intersessional meeting, held on 1 December 2021, had the following objectives: to present and discuss the draft resolution on space and global health, to present the progress on the design of the platform, and to discuss more specifically the proposed mechanism for facilitating the matching of stakeholders with similar interests.
7. At its 3rd meeting, on 11 February, the Working Group agreed on the following proposed actions to be taken by the Subcommittee:
  - (a) Make “Space and global health” a permanent item on the agenda of the Subcommittee from 2023 onwards;
  - (b) Welcome the establishment of the dedicated, cooperative, globally accessible and multifaceted Space and Global Health Platform, based in Geneva, to promote effective collaboration on space and global health issues among Member States and United Nations system entities, in particular the World Health Organization and the Office for Outer Space Affairs, as well as international organizations and relevant actors, as proposed in conference room paper A/AC.105/C.1/2022/CRP.12;
  - (c) Welcome the establishment of the Space and Global Health Network, led by a steering committee and chaired by a coordinator (see A/AC.105/C.1/2022/CRP.12), and decide to appoint Antoine Geissbühler as Coordinator;

(d) Invite the Space and Global Health Network to provide annual reports to the Subcommittee through its Coordinator;

(e) Decide that the work of the Space and Global Health Network should be facilitated by the Office for Outer Space Affairs within existing resources, in particular for scheduling meetings on the margins of the sessions of the Committee and its Subcommittees and publishing unedited, untranslated documents.

8. The Working Group considered the draft resolution on space and global health, contained in document [A/AC.105/C.1/L.402](#). On the basis of its deliberations held at informal and formal meetings of the Working Group during the session, as reflected in the revised version of the draft resolution, contained in [A/AC.105/C.1/2022/CRP.21](#), the Working Group agreed to the amended text and the format of the draft resolution, as contained in the appendix to the present report of the Working Group, for endorsement by the Subcommittee and to be subsequently made available in a document in the six official languages of the United Nations for consideration by the Committee on the Peaceful Uses of Outer Space at its sixty-fifth session, in 2022, with a view to its adoption by the General Assembly.

9. The Working Group considered its draft report on the work conducted under its multi-year workplan ([A/AC.105/C.1/L.403](#)), prepared by the Chair of the Working Group. The Working Group agreed to its final report, as a whole, to be entitled “Report of the Working Group on Space and Global Health on the work conducted under its multi-year workplan”, to be issued in the six official languages of the United Nations as document [A/AC.105/C.1/121](#), for endorsement by the Subcommittee and submission to the Committee on the Peaceful Uses of Outer Space at its sixty-fifth session, in 2022.

10. The Working Group noted with appreciation the presentations on the recommender system for the globally accessible platform on space and global health, delivered in the context of the informal consultations by the representative of the University of Geneva, and the presentation entitled “Open educational resources in space and global health”, also delivered in the context of the informal consultations, by the representatives of the University of Koblenz-Landau and Saarland University, and noted that a workshop on open educational resources would be held on 27 April 2022.

11. The Working Group noted with appreciation that the contents of the web page of the Office for Outer Space Affairs dedicated to the work of the Working Group ([www.unoosa.org/oosa/en/ourwork/copuos/stsc/gh/index.html](http://www.unoosa.org/oosa/en/ourwork/copuos/stsc/gh/index.html)) had been continuously updated.

12. At its 4th meeting, on 16 February, the Working Group adopted the present report.

## Appendix

### Draft resolution on space and global health

*The General Assembly,*

*Recalling* its resolutions 51/122 of 13 December 1996, 54/68 of 6 December 1999, 59/2 of 20 October 2004, 66/71 of 9 December 2011, 69/85 of 5 December 2014, 70/1 of 25 September 2015, 71/90 of 6 December 2016, 73/91 of 7 December 2018 and 76/3 of 25 October 2021,

*Recalling also* the recommendations contained in the resolution entitled “The Space Millennium: Vienna Declaration on Space and Human Development”, adopted by the third United Nations Conference on the Exploration and Peaceful Uses of Outer Space,<sup>2</sup> in which participating States called for action to improve public health services by expanding and coordinating space-based services for telemedicine and for controlling infectious diseases,

*Recalling further* the fiftieth anniversary of the first United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE+50) and its thematic priority 5, on strengthened space cooperation for global health,

*Acknowledging* the importance of the contribution of space science and technology and their applications to efforts towards the achievement of the 2030 Agenda for Sustainable Development,<sup>3</sup> in particular Sustainable Development Goal 3, on ensuring healthy lives and promoting well-being for all at all ages, and conscious that the work done in the space health sector can contribute to sustainable development, especially with programmes aimed at enhancing the quality of life in various ways, including improving human health,

*Emphasizing* that overarching objective 2 of the “Space2030” Agenda,<sup>4</sup> to harness the potential of space to solve everyday challenges and leverage space-related innovation to improve the quality of life, could be attained by strengthening space-related cooperation in support of global health, by improving the use and application of space medicine, science and technology, innovations in the global health domain, cooperation and the sharing of information, while protecting the privacy of personal data, and tools to improve research advancement and the timeliness and effectiveness of public health and health-care interventions, and by enhancing capacity-building in space medicine, science and technology,

*Convinced* of the importance, and recognizing the existing contributions, of space science, space technology and space applications to enhance space life sciences and digital health technologies, such as telehealth, telemedicine<sup>5</sup> and tele-epidemiology, for the prevention and control of diseases and global health issues, the promotion of human health, environmental health, animal health and food sourcing and supply, and the advancement of medical research and health practices, including the provision of health-care services to individuals and communities irrespective of geographical location as a means of promoting equitable, affordable and universal access to health for all,

*Noting with concern* that among the gaps in the areas of telemedicine and telehealth are the limited uptake of digital technologies in public health systems and

<sup>2</sup> *Report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 19–30 July 1999* (United Nations publication, Sales No. E.00.I.3), chap. I, resolution 1.

<sup>3</sup> Resolution 70/1.

<sup>4</sup> Resolution 76/3.

<sup>5</sup> The term “telemedicine” is used broadly to refer to the use of telecommunications, satellite communications and information technology to provide clinical health care from a distance and includes many active and relevant subfields, such as tele-cardiology, tele-radiology, tele-ophthalmology, tele-oncology, tele-pharmacy, tele-surgery, tele-dermatology and other developing fields.

health care, as well as the lack of harmonized data-sharing standards among the various manufacturers of medical equipment,

*Noting with satisfaction* the work of the Committee on the Peaceful Uses of Outer Space, its subsidiary bodies and the Office for Outer Space Affairs of the Secretariat in the area of space and global health, including in the framework of action team 6, on public health, established to implement the recommendations of the third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, as well as the action team 6 follow-up initiative, the Expert Group on Space and Global Health, UNISPACE+50 thematic priority 5, on strengthened space cooperation for global health, and the Working Group on Space and Global Health of the Scientific and Technical Subcommittee of the Committee, and welcoming its report on the work conducted under its multi-year work plan,<sup>6</sup>

*Deeply concerned* about the devastating global effects of emerging infectious diseases and other emergencies with an impact on health, including the coronavirus disease (COVID-19) pandemic, to the detriment of human life, society and development, and urging the international community to embrace a One Health approach by strengthening the role of space-based solutions, in particular telehealth, in monitoring, preparedness and response activities,

1. *Encourages* United Nations entities, intergovernmental organizations, Governments and the private sector to pursue effective coordination in all key space activities relevant to global health;

2. *Encourages* formalized cooperation between health authorities and space authorities at the domestic level, and welcomes existing cross-sectoral networks that foster the exchange of ideas between the space and health sectors;

3. *Encourages* Member States to establish a policy-enabled environment and governance mechanisms, with due consideration of legal and ethical issues, for removing challenges to facilitating the effective use of space-based technologies in support of global health, including telemedicine solutions and other emerging technologies;

4. *Also encourages* Member States to promote open data-sharing policies and participatory approaches to developing and improving access to all geospatial information relevant to global health, including remote sensing and Earth observation data, whenever possible;

5. *Further encourages* Member States to enable organizational and technical interoperability and promote research and innovation activities to facilitate the development and implementation of space-based science and technology in the health sector;

6. *Urges* United Nations entities and intergovernmental organizations to support the wider development of, equitable access to and application of space solutions for global health, public health, including epidemics and pandemics, emergencies that may have an impact on health, and the individual health needs of Member States, and encourages the implementation of a broader range of space solutions for sustainable development, including public-private partnerships;

7. *Encourages* Member States and participating entities to advance their efforts related to the geotagging of all assets relevant to health systems, including health information systems, and to make them available to further the attainment of health goals;

8. *Encourages* Member States to recognize the relevance of access to the space environment and space analogues<sup>7</sup> for health and life sciences research and

<sup>6</sup> A/AC.105/C.1/121.

<sup>7</sup> Space analogues include parabolic flights, bed rest studies and expeditions to Antarctica and other isolated, confined and extreme environments that simulate the space environment on Earth.

development, especially in the area of astronaut health for social and economic benefits on Earth;

9. *Also encourages* Member States to actively promote international cooperation in the field of space medicine on the basis of equal opportunities for all interested participants and in the interests of the further exploration of outer space by humankind, and further scientific and technological development and applications in the interests of global health;

10. *Further encourages* Member States to conduct appropriate drills and exercises to benchmark their operational preparedness and response capacities and capabilities for the appropriate use of space technologies in responding to global health events;

11. *Welcomes* the establishment of a dedicated, cooperative, globally accessible, multifaceted platform based in Geneva to promote effective collaboration on space and global health issues among Member States, United Nations entities, other international organizations and relevant actors;

12. *Emphasizes* that all key activities, reference documents and plans relevant to space for global health carried out or prepared by United Nations entities should be monitored and compiled on an annual basis, including those of the World Health Organization, other international organizations and States members of the Committee on the Peaceful Uses of Outer Space, as well as, to the extent possible, non-governmental organizations and other non-governmental actors, and also emphasizes that the resulting annual compilation of activities should serve as a reference to identify and discuss gaps and opportunities and should be shared broadly in an effort to raise awareness and promote cooperation among relevant actors in this domain;

13. *Recognizes* the importance of analysing and assessing the roles and interests of current actors in the domain of space and global health, with the aim of promoting synergy, complementarity, cooperation and coordination among all actors;

14. *Emphasizes* the need to enhance, in an equitable and sustainable manner, intersectoral coordination and cooperation for effective international, regional, national and subnational capacity-building activities relevant to the application of space science and technology in the field of global health;

15. *Encourages* Member States to engage learning institutions and other capacity-building mechanisms in motivating young health professionals, at an early stage, to acquire space-related skills and abilities;

16. *Agrees* to promote capacity-building events, to be organized by United Nations entities and other relevant actors, with the objective of further promoting awareness of and engagement with regard to the important contribution of space science and technology among actors applying One Health approaches, with a view to increasing the number of organizations and other actors in the health domain that are actively engaged in using space science and technology;

17. *Requests* the Office for Outer Space Affairs to strengthen, within existing resources, capacity-building and networking in Africa, Asia and the Pacific and Latin America and the Caribbean, through regional technical cooperation projects, and to support field projects for strengthening collaboration between the space and global health sectors as an efficient strategy for making better use of space science and technology for access to global health for beneficiary States and taking better advantage of opportunities offered by bilateral or multilateral collaboration;

18. *Encourages* Member States to foster linkages between academia, national experts, telecommunications regulatory authorities and science and technology authorities with a view to improving access to and the use of digital technologies and information systems in health care.