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## **Report of the Scientific and Technical Subcommittee on its fifty-eighth session, held in Vienna from 19 to 30 April 2021**

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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-eighth session at the United Nations Office at Vienna from 19 to 30 April 2021, in a hybrid format (in person and online), with Natália Archinard (Switzerland) as Chair.
2. The Subcommittee held 20 meetings.

### A. Attendance

3. Representatives of the following 77 States members of the Committee attended the session: Algeria, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Cuba, Cyprus, Czechia, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Finland, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Japan, Jordan, Kenya, Lebanon, Luxembourg, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Nicaragua, Norway, Oman, Pakistan, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Singapore, Slovakia, South Africa, Spain, Sri Lanka, 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. Observers for the Food and Agriculture Organization of the United Nations, the International Civil Aviation Organization (ICAO), the International Telecommunication Union (ITU), the United Nations Industrial Development Organization, the United Nations Institute for Disarmament Research, the International Atomic Energy Agency (IAEA) and the Office for Disarmament Affairs of the Secretariat attended the session.
5. 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 resolution [65/276](#).
6. The session was attended by observers for 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 Regional Centre for Remote Sensing of the North African States (CRTEAN).
7. The session was attended by observers for the International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG), in accordance with the agreement of the Subcommittee at its fifty-third session ([A/AC.105/1109](#), para. 182).
8. The session was attended by observers for the following non-governmental organizations having permanent observer status with the Committee: CANEUS International; Committee on Space Research (COSPAR); the European Science Foundation, represented by the European Space Sciences Committee; For All Moonkind; International Association for the Advancement of Space Safety (IAASS); International Astronautical Federation (IAF); International Astronomical Union (IAU); International Organization for Standardization (ISO); International Space University (ISU); Moon Village Association; National Space Society (NSS); Prince Sultan Bin Abdulaziz International Prize for Water (PSIPW); Scientific Committee on Solar-Terrestrial Physics (SCOSTEP); Secure World Foundation (SWF); Space Generation Advisory Council (SGAC); University Space Engineering Consortium-Global (UNISEC-Global); and World Space Week Association (WSWA).

9. 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.1/2021/INF/50.

10. The Subcommittee was informed by the Secretariat of the applications for membership in the Committee submitted by Bangladesh (A/AC.105/C.1/2021/CRP.3) and Slovenia (A/AC.105/C.1/2021/CRP.22), which were to be considered by the Committee at its sixty-fourth session, in 2021.

11. The Subcommittee was also informed by the Secretariat of the applications for permanent observer status with the Committee submitted by the International Institute for the Unification of Private Law (UNIDROIT) (A/AC.105/C.1/2021/CRP.9) and the Open Lunar Foundation (A/AC.105/C.1/2021/CRP.11), which were to be considered by the Committee at its sixty-fourth session, in 2021.

## **B. Adoption of the agenda**

12. At its 935th meeting, on 19 April, the Subcommittee adopted the following agenda:

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.
13. Future role and method of work of the Committee.
14. Use of nuclear power sources in outer space.
15. Space and global health.
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 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.
17. Draft provisional agenda for the fifty-ninth session of the Scientific and Technical Subcommittee.
18. Report to the Committee on the Peaceful Uses of Outer Space.

## C. General statements

13. Statements were made by representatives of the following member States during the general exchange of views: Algeria, Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Cuba, Czechia, Egypt, Finland, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Israel, Italy, Japan, Kenya, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Pakistan, Paraguay, Peru, Philippines, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Singapore, Slovakia, South Africa, Spain, Switzerland, Thailand, Ukraine, United Kingdom, United States and Venezuela (Bolivarian Republic of). A statement was also made by the representative of Costa Rica on behalf of the Group of 77 and China. The observer for the European Union made a statement. Additional statements were made by the observers for APSCO, CRTEAN, For All Moonkind, IAF, ISU, the Moon Village Association, SGAC, SWF, UNISEC-Global and WSWA.

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

(a) “Chilean development facility and space mission programme”, by the representative of Chile;

(b) “Chang’e-5 and Tianwen-1”, by the representative of China;

(c) “Data analysis as basic input for good governance in space environment management”, by the representative of Austria;

(d) “Indian space programme: 2020 updates and priorities”, by the representative of India;

(e) “Technical presentation on recommendations from the Dark and Quiet Skies for Science and Society workshop”, by the observer for IAU;

(f) “World Space Week 2021: women in space”, by the observer for WSWA;

(g) “On-orbit servicing, assembly and manufacturing (OSAM-1) contributions to the Artemis programme”, by the representative of the United States;

(h) “Smart space communications using 3D beam-steering plasma antennas”, by the representative of the Islamic Republic of Iran;

(i) “Fostering scalable, resilient utility infrastructure for cislunar space”, by the observer for NSS;

(j) “Radio signal interference detection from space”, by the representative of Austria;

(k) “The vision of a space safety institute”, by the observer for IAASS;

(l) “Moon Village Association contribution to sustainable lunar exploration and utilization”, by the observer for the Moon Village Association;

(m) “PSIPW ninth awards ceremony and conference”, by the observer for PSIPW;

(n) “All-sky X-ray map: orbital observatory Spectrum-Roentgen-Gamma (SRG) with X-ray telescopes ART (Russian Federation) and eROSITA (Germany)”, by the representative of the Russian Federation;

(o) “60 years since Yuri Gagarin’s flight – the founders of former Union of Soviet Socialist Republics (USSR) practical cosmonautics: S.P. Korolev and M.V. Keldysh”, by the representative of the Russian Federation;

(p) “NASA’s view of climate change from space”, by the representative of the United States;

(q) “Findings and recommendations from recent space traffic management webinars co-organized by IAASS and the Aerospace Corporation”, by the observer for IAASS;

- (r) “India’s international cooperation in space”, by the representative of India;
- (s) “Mission idea contest for deep space science and exploration with micro- and nanosatellites”, by the observer for UNISEC-Global;
- (t) “Open architecture data repository”, by the representative of the United States;
- (u) “European Space Resources Innovation Centre”, by the representative of Luxembourg;
- (v) “Eurasian regional centre for space science and technology education, affiliated to the United Nations”, by the representative of the Russian Federation;
- (w) “NASA and Office for Outer Space Affairs memorandum of understanding to enhance its longstanding partnership”, by the representative of the United States.

15. At the 935th meeting, on 19 April, the Chair of the Subcommittee made a statement outlining the work of the Subcommittee at its fifty-eighth session. She noted that the emergence of new technologies and new actors at an unprecedented rate could encourage further development and appreciation of space applications among a wider group of people and should encourage the Subcommittee in its efforts to promote international cooperation and the enhanced use of space technologies for socioeconomic development and to address global challenges. She also noted that, despite the impact of the pandemic, which had caused disruptions of a magnitude unprecedented in contemporary history to many sectors, space activities were continuing to develop steadily. Furthermore, the contribution that outer space activities were making to the attainment of the 2030 Agenda for Sustainable Development continued to be immense, not least considering the impact of the coronavirus disease (COVID-19) pandemic on society, and thus it would be important to continue supporting the peaceful pursuit of common goals in space that have illustrated the very best of what humankind can achieve together.

16. 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-seventh session of the Subcommittee, including the Office’s contribution to the United Nations system-wide response to COVID-19, the quantitative and qualitative expansion of the Office’s services rendered to Member States and the success in the work towards the strategic and structural implementation of the enhanced role of the Office and its Director within the United Nations system, following the issuance in 2020 of the Secretary-General’s bulletin on the organization of the Office for Outer Space Affairs ([ST/SGB/2020/1](#)). She introduced the current and planned strategic priorities in the work of the Office, which continued to advance its role as the gateway to space in the United Nations, including in its fundamental capacity as substantive secretariat to the Committee and its Subcommittees. 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, and also manifested the continued, and even reinforced, interest of space stakeholders in international cooperation and multilateralism through the United Nations, as the key path to the future we want.

17. The Subcommittee recalled that 12 April 2021 had marked the sixtieth anniversary since the Soviet cosmonaut Yuri Gagarin had carried out the first-ever human space flight, opening the way for space exploration for the benefit of all humanity. In that connection, the Subcommittee also recalled that the General Assembly, in its resolution [65/271](#) of 7 April 2011, had declared 12 April as the International Day of Human Space Flight to celebrate the beginning of the space era for humankind, thereby reaffirming the important contribution of space science and technology in achieving sustainable development goals and increasing the well-being of States and peoples, as well as ensuring the realization of their aspiration to maintain outer space for peaceful purposes.

18. The Subcommittee noted with regret the passing of Luboš Perek of Czechia, a renowned astronomer at the international level, former Chief of the Outer Space Affairs Division, United Nations Secretariat (1975–1980), and an active contributor for many years to the work of the Subcommittee and of the Committee as a whole.

19. The Subcommittee agreed that it, together with the Committee and the Legal Subcommittee, 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.

20. 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.

21. The Subcommittee noted that the work relating to the “Space2030” agenda and its implementation plan 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.

22. 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.

23. The Subcommittee noted that space activities had intensified significantly in recent years, with more and more actors entering the space arena and more space objects being placed in outer space.

24. Some delegations expressed the view that ongoing international collaboration and coordination to develop common practices and standards would be particularly essential and would also contribute to transparency and the building of trust between the various actors in space, thereby reducing the risk of accidents and potential conflicts.

25. Some delegations expressed the view that it was very important to foster international cooperation and to establish principles guiding responsible behaviour in, and the sustainability of, space activities. In that connection, there was a need to strengthen commitments to avoiding potentially harmful interference with the peaceful exploration and use of outer space, facilitating equitable access to outer space and developing initiatives that would alleviate tensions and increase confidence and mutual trust among all space actors.

26. The view was expressed that the growing diversity and rapidly growing economic impact of activities in outer space were creating tensions between different users and stakeholders, and that that situation increasingly required the different interests of those users and stakeholders to be balanced. In that connection, it would be necessary to explore how the Committee and its Subcommittees could contribute to global governance and coordination of space traffic management and what role the Office for Outer Space Affairs could play in that regard.

27. Some delegations expressed the view that the Artemis Accords on the Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets and Asteroids for Peaceful Purposes strongly aligned with existing obligations under the Treaty on Principles Governing the Activities of States in the Exploration and Use of

Outer Space, including the Moon and Other Celestial Bodies, and that the Artemis Accords represented an important first step for those delegations towards achieving the safety and sustainability of exploration, science and commercial activities in deep space, including on the Moon and other celestial bodies. The same delegations also expressed the view that they looked forward to continuing to exchange views within the Committee and its Subcommittees.

28. Some delegations expressed the view that the framework of the Outer Space Treaty and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies represented a strong foundation for any activities on the lunar surface, and those same delegations indicated that any such accords that had not been negotiated within the multilateral United Nations system and the Committee could not be recognized as legitimate legal treaties such as were the five United Nations treaties on outer space.

29. Some delegations expressed the view that the work of the Subcommittee should support measures to enhance international cooperation in space activities to ensure that such activities benefit all the peoples of the world. In that regard, it was important to continue to respect the established principles guiding outer space activities, including the principle of the exploration and use of outer space on the basis of equality, the principle of the non-appropriation of outer space, including the Moon and other celestial bodies, and the peaceful use of outer space.

30. Some delegations expressed the view that, in order for it to achieve its main objectives, it was important for the Subcommittee to concentrate its work in areas such as the building and promotion of technological capacities, the transfer of technology favourable to developing countries, the prevention and mitigation of natural disasters, and scientific and technological research in developing countries, within the framework of international cooperation. The delegations expressing that view were also of the view that the only way to ensure the sustainability of outer space activities was to continue to deliver benefits derived from it to humanity as a whole through enhanced cooperation and collaboration.

31. Some delegations expressed the view that the Subcommittee should remain the main forum for the enhancement of cooperation on 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, on space matters.

32. The Subcommittee was informed of the conference room paper submitted by the Moon Village Association entitled “Report of the Moon Village Association on the Global Expert Group on Sustainable Lunar Activities” (A/AC.105/C.1/2021/CRP.20).

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

(a) Side event entitled “From the shadow of exoplanets and lost dark skies: enlightenment by Michel Mayor and Didier Queloz, laureates of the Nobel Prize in Physics 2019”, organized by the delegation of Switzerland;

(b) Side event entitled “International Lunar Research Station”, co-organized by the delegations of China and the Russian Federation;

(c) Question-and-answer webinar entitled “KiboCUBE: sixth round”, organized by the delegation of Japan.

## D. National reports

34. The Subcommittee took note with appreciation of the reports by Member States (see [A/AC.105/1238](#), [A/AC.105/1238/Add.1](#), [A/AC.105/1238/Add.2](#) and [A/AC.105/1238/Add.3](#)) and of the conference room papers (A/AC.105/C.1/2021/CRP.4 and A/AC.105/C.1/2021/CRP.18) submitted for its consideration under agenda item 3, 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.

## E. Symposium

35. 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 the decisions and actions by the Committee and its Legal Subcommittee taken by written procedure (see [A/75/20](#)), a symposium organized by IAF on the topic of human space flight was held on 27 April 2021.

36. The symposium, entitled “Global views on human space exploration”, comprised two segments. The first segment, on 60 years of human space flight achievements, was co-moderated by Simonetta Di Pippo, Director of the Office for Outer Space Affairs, and Christian Feichtinger, Executive Director of IAF. The speakers on the first panel were Jean-Yves Le Gall of IAF, Sergey Krikalev of the State Space Corporation “Roscosmos” of the Russian Federation, John M. Logsdon of George Washington University, Lin Xiqiang of the China Manned Space Agency (CMSA), Thomas Reiter of ESA and Mika Ochiai of the Japan Aerospace Exploration Agency (JAXA).

37. The second segment, on looking ahead to the next 60 years, was co-moderated by Pascale Ehrenfreund, President of IAF, and Sergey Saveliev, Deputy Director General for International Cooperation of Roscosmos. The speakers on the second panel were Kathryn L. Lueders of the National Aeronautics and Space Administration (NASA) of the United States, Xiaojun Wang of the China Academy of Launch Vehicle Technology (CALT), Dimitry Loskutov of the joint stock company Glavkosmos of the Russian Federation, Lisa Campbell of the Canadian Space Agency (CSA), S. Somanath of Indian Space Research Organization (ISRO), Andreas Lindenthal of Airbus Defence and Space GmbH, and Kate Watts of Lockheed Martin Space Systems Company.

38. 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.

## F. Adoption of the report of the Scientific and Technical Subcommittee

39. After considering the items before it, the Subcommittee, at its 954th meeting, on 30 April 2021, 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

40. In accordance with General Assembly resolution [75/92](#), the Subcommittee considered agenda item 4, entitled “United Nations Programme on Space Applications”.

41. The representatives of China, India, Indonesia, Israel, Japan, Peru and the Russian Federation made statements under agenda item 4. During the general exchange of views, statements relating to the item were made by representatives of other member States.

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

(a) “The fifth anniversary of the Regional Centre for Space Science and Technology Education in Asia and the Pacific in the days of fighting COVID-19”, by the representative of China;

(b) “ISONscope cooperative programme of the Office for Outer Space Affairs and the Keldysh Institute of Applied Mathematics, under the Access to Space for All initiative”, by the representative of the Russian Federation.

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

43. The Subcommittee recalled that the General Assembly, in its resolution [74/82](#), 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.

44. The Subcommittee recalled with appreciation that 2021 marked the fiftieth anniversary since the beginning of work of the United Nations Programme on Space Applications and, in that connection, the Subcommittee recognized the unique and continuous contribution made by the Programme in promoting and supporting the capacity-building activities of Member States, in particular emerging spacefaring nations. In that regard, the Subcommittee acknowledged the instrumental role played by the Office for Outer Space Affairs in implementing the Programme.

45. At the 935th meeting, on 19 April, 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.

46. 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; Centre for Applied Space Technology and Microgravity; CMSA; China National Space Administration; Government of France; City of Graz, Austria; ESA; Graz University of Technology, Austria; Instituto de Astrofísica de Canarias, Spain; IAU; JAXA; Joanneum Research, Austria; 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.

47. The Subcommittee noted that the Office for Outer Space Affairs continued to collaborate with the Government of Japan, through the Kyushu Institute of Technology, in order to arrange for the future provision of long-term fellowship programme opportunities for students from developing countries under the United Nations/Japan Long-term Fellowship Programme on Nanosatellite Technologies. The Office also continued to collaborate with the Politecnico di Torino, Italy, evaluating the possibility of overhauling and reorganizing its master’s programme and long-term fellowship programme opportunities by broadening the subject areas covered and adding new elements pertinent to Galileo and other global navigation satellite systems and their applications.

48. The Subcommittee noted the Drop Tower Experiment Series, which was a fellowship programme of the Office for Outer Space Affairs, undertaken in collaboration with the Centre for 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. The announcement of opportunity for the eighth cycle of the Drop Tower Experiment Series had been issued in February 2021, with the deadline for the submission of applications set for 30 June 2021.

49. The Subcommittee noted the continued collaboration between the Office for Outer Space Affairs and the Government of Japan, in collaboration with JAXA, in implementing the United Nations/Japan Cooperation Programme on CubeSat Deployment from the International Space Station Japanese Experiment Module (Kibo), known as “KiboCUBE”. The second winner under the Programme, a team from Guatemala, had launched its first CubeSat, Quetzal-1, in April 2020. CubeSats developed by teams from Mauritius, Indonesia and the Republic of Moldova, which had been selected for the third and fourth rounds of the Programme, would be launched after the first two rounds. The final selection for the fifth round had been announced on 10 December 2020, with the Central American Integration System (SICA) selected as the winner. The objective of the cooperation programme was to promote international cooperation and capacity-building in space technology and its applications under the Human Space Technology Initiative by providing opportunities for educational and research institutions in developing countries to deploy CubeSats from Kibo.

50. The Subcommittee noted the continued cooperation between the Office for Outer Space Affairs and the Government of China, through CMSA, in implementing the 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.

51. The Subcommittee noted the Hypergravity Experiment Series (HyperGES), which was 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 was announced in June 2020 and a team from Mahidol University, Thailand, was 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.

52. 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 small- and medium-sized payloads hosted on the Bartolomeo platform, and the selected winner would receive a comprehensive range of mission services provided by Airbus Defence and Space. The first announcement of opportunity had been issued in October 2019, and the winners were to be announced in the second quarter of 2021.

53. 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 had been closed on 4 April 2021.

54. 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 on astronomy. The first announcement of opportunity had been issued in January 2021, with the deadline for the submission of applications set for 1 May 2021.

55. The Subcommittee noted that the Programme 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.

56. 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 the awareness of decision makers about the cost-effectiveness and additional benefits to be obtained from such technologies and data; and strengthening outreach activities to increase awareness of those benefits.

57. The Subcommittee further noted the following activities under the United Nations Programme on Space Applications, conducted by the Office in 2020, together with Member States and international organizations:

(a) United Nations/Austria symposium on the theme “Space applications for Sustainable Development Goal 13: climate action”, held in Graz, Austria, from 1 to 3 September 2020 ([A/AC.105/1231](#));

(b) United Nations/IAU/Spain Dark and Quiet Skies for Science and Society online workshop, held from 5 to 9 October 2020. Recommendations emanating from the workshop regarding satellite constellations, artificial light at night and radio signals were gathered in a conference room paper submitted by Chile, Ethiopia, Jordan, Slovakia, Spain and IAU ([A/AC.105/C.1/2021/CRP.17](#)).

58. 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 were to cover the following topics: space-based solutions for astronomy and the protection of astronomical observation facilities; water resources management; global navigation satellite systems; space weather; space applications for food systems; 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 its fifty-ninth session, in 2022.

59. The Subcommittee noted that, in addition to the United Nations conferences, training courses, workshops, seminars and symposiums conducted in 2020 and planned for 2021, the Office for Outer Space Affairs had conducted or was planning to conduct other activities under the Programme, 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.

60. 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).

61. The Subcommittee took note of the information provided by the Russian Federation explaining that the country was conducting consultations within a network of educational institutions to propose the establishment of a regional centre for space science and technology education, affiliated with the United Nations, and indicating its willingness to collaborate with other such regional centres in offering a high-quality educational degree in space science and technology.

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

62. 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 for Sustainable Development. 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.

63. The Subcommittee noted that the eighth African Leadership Conference on Space Science and Technology for Sustainable Development, on the theme “Prospects and challenges of African space development”, had been hosted at the Economic Commission for Africa, in Addis Ababa, from 2 to 4 December 2019. The Congress would in future be held on a biennial basis; the South African National Space Agency would host the next congress in Durban, South Africa, by the end of October 2021.

64. The Subcommittee also noted that the international conference entitled “Space and Sustainable Development 2020” (CEDS 2020) had been postponed as a result of the COVID-19 global pandemic and would be held at the Faculty of Physical Sciences and Mathematics of the University of Chile in July 2021. The objective of the conference would be to contribute to the examination and discussion of four topics: opportunities and challenges presented by space activity; the development of space

science and technology; innovation and industrial development; and the use of space as a global challenge and its contribution to sustainable development.

65. The Subcommittee further noted that the twenty-sixth session of the Asia-Pacific Regional Space Agency Forum (APRSAF), on the theme “Advancing diverse links towards a new space era”, had been held in Nagoya, Japan, from 26 to 29 November 2019. The twenty-seventh session of the Forum, which had been planned to be held in the third quarter of 2020, had been postponed and would be held in Viet Nam in the third quarter of 2021. In addition, the Subcommittee noted that the Forum had held an event in November 2020 entitled “APRSAF Online 2020”, on the theme “Sharing space visions beyond distance”.

66. The Subcommittee noted that, at the fourteenth meeting of the Council of APSCO, in December 2020, the Council had approved the Development Plan of Cooperative Activities of APSCO for 2021–2030. The strategic objectives of the Plan were focused on enhancing the capabilities of APSCO member States, as well as countries in the Asia-Pacific region, in the peaceful uses of outer space, including in the domains of space science, and space technology and its applications.

### III. Space technology for sustainable socioeconomic development

67. In accordance with General Assembly resolution 75/92, the Subcommittee considered agenda item 5, entitled “Space technology for sustainable socioeconomic development”.

68. The representatives of Algeria, China, Cuba, France, India, Indonesia, Italy, Japan, Mexico, Pakistan, Peru, the Russian Federation, Thailand and Venezuela (Bolivarian Republic of) made statements under agenda item 5. The observer for CANEUS International also made a statement under the item. During the general exchange of views, statements relating to the item were made by representatives of other member States.

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

(a) “Educational platform for space science and technology”, by the representative of Egypt;

(b) “WildTrackCube-SIMBA, an experimental university-class CubeSat for efficient wildlife tracking in Kenya”, by the representative of Italy;

(c) “Advancing Philippine space technology and applications for sustainable socioeconomic development”, by the representative of the Philippines;

(d) The commercial space industry in Africa and its readiness for innovation-driven investment: the space generation’s view”, by the observer for SGAC.

70. The Subcommittee had before it the following:

(a) Conference room paper on the status and outlook of the Space4Water project of the Office for Outer Space Affairs: three years of Space4Water (A/AC.105/C.1/2021/CRP.5);

(b) Conference room paper entitled “Access to Space for All initiative: opportunities, achievements and the way forward beyond 2020” (A/AC.105/C.1/2021/CRP.15).

71. The Subcommittee noted that the World Space Forum held in December 2020, on the theme “Space for our future”, had been organized jointly by the Office for Outer Space Affairs and the United Arab Emirates Space Agency and that the Forum had been instrumental in bringing together stakeholders from the broader space community, including governmental institutions, international intergovernmental

organizations and non-governmental organizations, as well as industry, the private sector and academia.

72. 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.

73. 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.

74. 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.

75. The view was expressed that developed countries should share the benefits of space technology with developing countries at a faster pace to ensure the optimum utilization of such technology for the benefit of all humankind.

76. The Working Group of the Whole was reconvened with Umamaheswaran R. (India) as Chair, in accordance with paragraph 5 of General Assembly resolution [75/92](#). At its 950th meeting, on 28 April 2021, 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**

77. In accordance with General Assembly resolution [75/92](#), the Subcommittee considered agenda item 6, entitled "Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment".

78. The representatives of Canada, China, Colombia, India, Indonesia, Iran (Islamic Republic of), Israel, Italy, Japan, Kenya, Mexico, the Russian Federation and the United States made statements under agenda item 6. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

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

(a) "Summary, achievements and major results of the 'PRISMA Mission and beyond' workshop", by the representative of Italy;

(b) "Space-based data and the fight against illegal fishing", by the representatives of Canada;

(c) "The current and future applications of thermal infrared remotely-sensed data for global warming studies", by the representative of the Islamic Republic of Iran.

80. In the course of the discussions, delegations reviewed national, bilateral, regional and international programmes on remote sensing, in particular in the following areas: 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; tele-health and epidemiology; watershed monitoring and development planning; irrigation infrastructure assessment; agriculture, horticulture and crop production forecasting; snow and glacier monitoring; and monitoring of oceans, glacial lakes and other water bodies.

81. 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 could serve the compilation of Sustainable Development Goal indicators.

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

83. 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 data and images, as well as direct satellite downlinks, to international partners, encouraged and promoted the use of remote sensing technology applications to support societal and commercial development.

84. Some delegations mentioned the importance of capacity-building 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.

85. The Subcommittee noted the continued support for the activities of the Committee on Earth Observation Satellites (CEOS), and also noted that ISRO was serving as Chair of CEOS for 2020. The Subcommittee further noted the continued support for the activities of the Group on Earth Observations.

## V. Space debris

86. In accordance with General Assembly resolution [75/92](#), the Subcommittee considered agenda item 7, entitled “Space debris”.

87. The representatives of Austria, Brazil, Canada, China, Finland, Germany, India, Indonesia, Italy, Japan, Kenya, Mexico, the Netherlands, Peru, the Russian Federation, Thailand, the United States and Venezuela (Bolivarian Republic of) 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.

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

(a) “Canadian space-based photometric measurements of the Starlink constellation”, by the representative of Canada;

(b) “2020 space debris activities in France: highlights”, by the representative of France;

(c) “The German Experimental Space Surveillance and Tracking Radar: a high-performance experimental radar for space surveillance”, by the representative of Germany;

(d) “SMOG-1, the fourth Hungarian PocketQube-class student satellite in low Earth orbit: radio frequency smog measurement system in low Earth orbit”, by the representative of Hungary;

- (e) “Space debris research at JAXA”, by the representative of Japan;
- (f) “United States space debris environment and activity updates”, by the representative of the United States;
- (g) “Space debris/sustainability activities of ESA in 2020”, by the observer for ESA;
- (h) “Space traffic management and space environment sustainability in the New Space era”, by the observer for IAASS.

89. The Subcommittee had before it 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 replies received from Member States and international organizations (see [A/AC.105/C.1/118](#), [A/AC.105/C.1/118/Add.1](#) and [A/AC.105/C.1/2021/CRP.6](#)).

90. 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.

91. 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 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.

92. The Subcommittee noted that some States were using the Space Debris Mitigation Guidelines of the Committee, the European Code of Conduct for Space Debris Mitigation, 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.

93. 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 ESA space situational awareness programme.

94. The Subcommittee expressed concern at the increasing amount of space debris and encouraged States, agencies, industries 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.

95. 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 2020 to reflect the evolving understanding of the space debris situation.

96. 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 in-orbit robotic servicing of satellites, the extension of satellite lifespans and active space debris removal.

97. The Subcommittee noted the development and application of new technologies and ongoing research related to space debris mitigation; collision avoidance; protecting space systems from space debris; limiting the creation of additional space debris; re-entry and collision avoidance techniques; measuring, characterizing, continuous monitoring and modelling of space debris; prediction, early warning and

notification of space debris re-entry and collision; and space debris orbit evolution and fragmentation.

98. 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.

99. 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.

100. The view was expressed that greater compliance with space debris mitigation guidelines and further work were needed to ensure that sufficient normative frameworks for space debris remediation could be identified and developed at the international level, and that consistent reporting on the national implementation of international normative frameworks was necessary.

101. Some delegations expressed the view that international cooperation was necessary to reduce the barriers and risks relating to feasible orbital debris removal missions, and that increased international agreement on the appropriate internationally accepted framework for such missions would be essential for ensuring that they could make positive, transparent contributions to the sustainability of the space environment.

102. Some delegations expressed the view that it was necessary to strengthen international cooperation in promoting research programmes related to space debris and in building the capacities of emerging countries in the space field, specifically in relation to space debris mitigation and remediation, including, inter alia, cooperation on evaluations and orbital calculation, predictive models, tools for monitoring space debris, operational protocols, and considerations for the design of satellites.

103. Some delegations expressed the view that international cooperation was necessary for the exchange of information relating to situational awareness and the sharing of information on objects and events in space.

104. Some delegations expressed the view that it was essential for all information related to the entry of space debris into the atmosphere to be communicated with diligence and promptness to those countries that might be affected by such debris.

105. The view was expressed that a worldwide network for the laser ranging of space debris should be developed to improve orbital predictions, as it would be useful for avoidance manoeuvres, conjunction warnings and removal missions.

106. The view was expressed that it was important to strengthen international cooperation not only on observation networks, but also on data sharing, and data-processing systems.

107. The view was expressed that there was a need to address the entire range of issues related to space debris, including legal, economic, technological and political aspects, within the framework of the Committee and on the basis of consensus.

108. The Subcommittee noted with satisfaction that the compendium of space debris mitigation standards adopted by States and international organizations was being continuously updated. The Subcommittee noted that the compendium, initiated by Canada, Czechia and Germany, could be consulted on the website of the Office for Outer Space Affairs, and encouraged Member States to continue to provide contributions and updates to it.

109. The Subcommittee agreed that Member States and international organizations having permanent observer status with the Committee should continue to be invited to provide reports on research on space debris, the safety of space objects with nuclear power sources on board, problems relating to the collision of such space objects with space debris and the ways in which debris mitigation guidelines were being implemented.

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

110. In accordance with General Assembly resolution [75/92](#), the Subcommittee considered agenda item 8, entitled “Space-system-based disaster management support”.

111. The representatives of Algeria, Canada, China, Colombia, Cuba, France, Germany, India, Indonesia, Israel, Japan, Mexico, Peru, the Russian Federation, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 8. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

112. The Subcommittee heard the following scientific and technical presentation: “Integrating indigenous knowledge and state-of-the-art Earth observation solutions for the Sendai Framework implementation”, by the observer for CANEUS International.

113. The Subcommittee had before it a report on activities carried out in 2020 in the framework of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) ([A/AC.105/1239](#)).

114. The Subcommittee noted with satisfaction the progress achieved through activities held in 2020 in the framework of UN-SPIDER and the continuing advisory and other support provided through UN-SPIDER to emergency response efforts.

115. The Subcommittee noted that, with the continued support of its network of partners, representatives of UN-SPIDER had carried out the following activities: (a) a technical advisory mission to Tunisia; (b) virtual support to several countries in Africa, Asia, and Latin America and the Caribbean; and (c) employment of short-term consultants to carry out activities at the national level in Mongolia and Sri Lanka. During those activities, specific requirements had been addressed and follow-up had been provided to the UN-SPIDER technical advisory missions carried out in previous years.

116. The Subcommittee noted with satisfaction the capacity-building efforts carried out by UN-SPIDER, including the generation of tailor-made space-based information for three countries affected by floods (the Niger, Nigeria and Tunisia) and countries experiencing forest fires (various Latin American countries) and the provision of virtual support through a massive open online course on the use of geospatial and Earth observation technologies in disaster risk management.

117. The Subcommittee noted that UN-SPIDER had expanded its network of regional support offices by integrating two additional organizations into the network: the Federal University of Santa Maria in Brazil and the Ben-Gurion University of the Negev in Israel.

118. The Subcommittee noted the continued outreach activities, including webinars and virtual expert meetings, carried out by the Office for Outer Space Affairs, represented by UN-SPIDER, and the Office’s partnerships with United Nations entities, international organizations and Member States to continue promoting the use of space-based tools and information.

119. The Subcommittee noted ongoing activities to increase 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 cartographic data during natural or technological disasters under the International Charter on Space and Major Disasters, the Sentinel Asia project and the Copernicus Emergency Management Service. In that regard, it was noted that UN-SPIDER had assisted Cameroon, Costa Rica, Ethiopia, the Gambia, Mozambique, the Niger, Panama, Zimbabwe and the Cayman Islands in becoming authorized users. It was also noted that the activation by UN-SPIDER of the International Charter had successfully facilitated access to satellite imagery and space-based information in support of

disaster response following floods in Mexico, the Niger and the Sudan, and a landslide in Myanmar.

120. Some delegations expressed the view that Earth observation, global navigation satellite systems and emerging complementary technologies, including artificial intelligence, cloud computing and visualization technologies, were making an important contribution to disaster risk reduction. Those delegations also expressed the view that Earth observation and emerging complementary technologies could also be applied in the monitoring of climate, climate change and disasters caused by changing climate conditions.

121. Some delegations expressed the view that the use of Earth observation data and complementary technologies was essential for supporting the prediction of disasters such as river and coastline flooding and forest fires, and was an essential feature of the best models of effective responses in both remote and populated areas.

122. Some delegations expressed the view that space-based emergency mapping could be achieved more effectively through international collaboration. The delegations expressing that view also expressed the view that the provision of Earth observation data and images of disaster areas supported under activations of the Charter was a key example of international collaboration in that regard.

123. Some delegations expressed the view that Earth observation data and images were a crucial aspect of effective and timely disaster management and emergency response and that utilizing such data and images contributed substantially to continuous monitoring and detection for early warning. The delegations expressing that view also expressed the view that international collaboration and support under activations of the Charter provided decision makers with crucial and timely data and images to support effective emergency response.

124. The Subcommittee noted the in-kind contributions, including the provision of experts, made by States members of the Committee and regional support offices in 2020 in support of an advisory mission, advisory webinars, virtual expert meetings and related activities conducted by the Office for Outer Space Affairs through UN-SPIDER, and their efforts to share experiences with other interested countries.

125. The Subcommittee noted with appreciation the voluntary contributions made to the Office for Outer Space Affairs and its UN-SPIDER programme by member States, including the cash contributions from China and Germany, and again encouraged other member States to provide to the activities and programmes of the Office, including UN-SPIDER, all necessary support on a voluntary basis, including increased financial support, to enable it to better respond to Member States' requests for assistance and to fully carry out its workplan in the coming years.

## **VII. Recent developments in global navigation satellite systems**

126. In accordance with General Assembly resolution [75/92](#), the Subcommittee considered agenda item 9, 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.

127. The representatives of China, India, Indonesia, Japan, Kenya, Mexico, the Russian Federation and the United States made statements under agenda item 9. During the general exchange of views, statements relating to the item were made by representatives of other member States.

128. The Subcommittee heard a technical presentation entitled "Development of the BeiDou Navigation Satellite System", by the representative of China.

129. The Subcommittee had before it the report of the Secretariat on activities carried out in 2020 in the framework of the workplan of the International Committee on Global Navigation Satellite Systems ([A/AC.105/1237](#)).

130. The Subcommittee noted that the Office for Outer Space Affairs continued to play an active role in facilitating cooperation and communication among the providers and users of GNSS.

131. 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.

132. The Subcommittee noted with satisfaction that the ICG working groups continued to implement their workplans. The Subcommittee noted the progress made on GNSS compatibility and interoperability and on spectrum protection and interference detection and mitigation. Progress had also been made towards the development of a technical booklet on the importance of GNSS spectrum protection and interference detection and mitigation.

133. The Subcommittee noted that ICG had continued its work aimed at creating an interoperable, multi-GNSS space service volume that would enable improved navigation for future space operations beyond the geostationary orbit or even for lunar missions.

134. The Subcommittee noted that the fifteenth meeting of ICG would be hosted by the Office for Outer Space Affairs in Vienna from 27 September to 1 October 2021.

135. 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 third civil signal, L1C. It was noted that two Block III satellites had been launched in 2020 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 satellites.

136. The Subcommittee noted that the United States intended to continue improving the accuracy and availability of GPS through the enhanced performance of modernized 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.

137. The Subcommittee noted that the Global Navigation Satellite System (GLONASS) constellation of the Russian Federation was upgraded on an ongoing basis, with new satellites added each year. In 2020, two satellites had been launched, one of which was the third generation of the GLONASS constellation, namely, the GLONASS-K satellite. That constellation provided users with a broader range of capabilities and a more accurate and informative code division multiple access (CDMA) signal. Further gradual rejuvenation of the GLONASS constellation would ensure ongoing improvement in the quality of navigation services provided.

138. The Subcommittee also noted that the development of the GLONASS constellation remained focused on user requirements, primarily on the provision of high-quality navigation services in difficult terrain. In order to satisfy those needs, the development of the GLONASS high-orbit space complex was planned, and its first satellite would be launched in 2025.

139. The Subcommittee noted that in 2020, the BeiDou Navigation Satellite System (BDS) constellation of China had been successfully completed and currently consisted of 30 operational satellites in the BDS-3 system, providing global coverage. It was noted that, at the global level, BDS-3 had a positioning accuracy within 10 metres, speed measurement accuracy within 0.2 metres per second and timing accuracy within 20 nanoseconds, while at the regional level, those indicators stood at 5 metres, 0.1 metres per second and 10 nanoseconds, respectively.

140. The Subcommittee also noted that BDS provided several types of services to users worldwide, including regional and global short message communication services to the civil community; a satellite-based augmentation service (in test

operation) for users with high-integrity requirements in the civil aviation, maritime and railway sectors; a precision point positioning service for users in the precision agriculture, land surveying and autonomous driving sectors; and an international search-and-rescue service.

141. 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.

142. 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, had been developed by the Indian Space Research Organization (ISRO), together with the Airports Authority of India, to provide the increased positioning accuracy required for civil aviation applications. NavIC had been implemented as an independent regional satellite-based navigation service.

143. The Subcommittee further noted that, in 2020, NavIC had been recognized as a component of the Worldwide Radionavigation System by the International Maritime Organization, and that it had been incorporated into the standards of the Third Generation Partnership Project (release 16). A NavIC-based emergency messaging system was also in operation for fishermen to provide alerts on impending disasters.

144. 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.

145. The Subcommittee also noted that Japan was currently developing a GNSS augmentation service for high-accuracy applications based on a precise point positioning (PPP) technique called the Multi-GNSS Advanced Demonstration Tool for Orbit and Clock Analysis (MADOCA-PPP), which would go into service by 2023, and that an early warning service for the Asia and Oceania region would be put into operation in 2024.

146. The Subcommittee noted with appreciation that Indonesia, Kenya and Mexico 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

147. In accordance with General Assembly resolution [75/92](#), the Scientific and Technical Subcommittee considered agenda item 10, entitled “Space weather”.

148. The representatives of Australia, Austria, Brazil, Canada, China, Germany, India, Indonesia, Iran (Islamic Republic of), Israel, Italy, Japan, Kenya, Mexico, Peru, the Russian Federation, South Africa and the United States made statements under agenda item 10. 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.

149. The Subcommittee had before it a conference room paper containing a draft report of the Expert Group on Space Weather on the topic “Survey of the state of member State preparedness, and current and future activities and needs for space weather impact mitigation”, submitted by the Rapporteur of the Expert Group on Space Weather as a working paper (A/AC.105/C.1/2021/CRP.14).

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

(a) “China Meteorological Administration space weather activities”, by the representative of China;

(b) “Space weather activities in Austria”, by the representative of Austria;

(c) “Current status of the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) PRESTO programme for predictability of the variable solar-terrestrial coupling”, by the observer for SCOSTEP.

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

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

153. The Subcommittee noted the importance of long-term and effective collaboration, and the continuing need for coordination and collaboration among national and international space weather actors to address the threats arising from the adverse impacts of space weather, which served to enhance the understanding of both the drivers and the impacts of space weather and thus improve global capacity in monitoring, forecasting and mitigating severe space weather events.

154. The Subcommittee also noted the importance of the work of the World Meteorological Organization, 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 Member States’ engagement with COSPAR in developing international space weather action teams for scientific research in support of transitional efforts related to research for operations, and in the space weather-related work of ITU and the International Space Environment Service.

155. The view was expressed that it was necessary for countries with developed space weather capacity to cooperate with emerging spacefaring nations by sharing lessons learned on national space weather plans and research, and by sharing data, so that all countries could progress in the development of technical capacities and technology and increase knowledge and research activities, with a view to mitigating the adverse effects of space weather.

156. The view was expressed that a repository of open data on space weather obtained from ground- and space-based infrastructure, provided by multiple entities of Member States, could be established through the Committee on the Peaceful Uses of Outer Space to further enable research, the sharing of data and cooperation at the international level on that matter of global concern, and thus improve the prediction of potentially severe space weather events and the mitigation of their impacts.

157. The view was expressed that certain regions were exposed to more pronounced effects of space weather as a result of certain phenomena, such as the South Atlantic Magnetic Anomaly, which caused an increased flux of energetic particles over an area of South America. In that context, the International Meridian Circle Programme of China, aimed at studying geomagnetic anomalies, was also noted.

158. 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 establishment of the fourth ICAO global space weather information centre, tasked with providing to the civil aviation sector information about space weather that could potentially affect communications, navigation and the health of passengers and crew.

159. The Subcommittee noted that a virtual workshop on the International Space Weather Initiative was to be organized in 2021 by India, in cooperation with the Office for Outer Space Affairs, in an effort to build synergies and maximize potential outcomes of various endeavours around the world aimed at studying space weather.

160. At the 946th meeting of the Subcommittee, on 26 April, 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.

161. The Expert Group noted the growing interest among member States in addressing the challenges associated with mitigating the adverse impacts of space weather and highlighted the important opportunity to improve global preparedness through the implementation of the guidelines relating to space weather in the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee. The Expert Group also noted the increasing activity in recent years in a number of international organizations to improve global preparedness and increase international collaboration against the threat arising from the adverse impact of space weather.

162. Consistent with the proposal submitted to the Subcommittee at its fifty-seventh session, the Expert Group conducted intersessional surveys among member States on their space weather activities and among international organizations operating in the domain of, or affected by, space weather.

163. Based on the responses to the surveys, the Expert Group presented a set of draft recommendations towards the goal of implementing the guidelines relating to space weather in the Guidelines for the Long-term Sustainability of Outer Space Activities and towards improved international collaboration, in a working paper entitled “Draft report of the Expert Group on Space Weather: survey of the state of member State preparedness, and current and future activities and needs for space weather impact mitigation” (A/AC.105/C.1/2021/CRP.14). The Expert Group invited member States to comment on the draft set of recommendations and requested that the inputs be directed to the Rapporteur of the Expert Group, ideally prior to the sixty-fourth session of the Committee, and with a deadline of 31 August 2021.

164. The Subcommittee took note of the progress report of the Expert Group (A/AC.105/C.1/2021/CRP.23), which included the Expert Group’s request to extend its mandate. In view of the report, the Subcommittee agreed to extend the mandate of the Expert Group for a further year. In that connection, the Subcommittee agreed on the following programme of intersessional work for the Expert Group:

(a) Finalize the analysis of the results of the second survey of member States and of the survey of international organizations;

(b) Finalize the set of recommendations, taking account of any further inputs from the Expert Group and from member States, and make the final version of the report on the surveys available to all delegations at the fifty-ninth session of the Subcommittee;

(c) Compile a draft final report of the Expert Group, including draft final recommendations to address and better serve the space weather-related needs of member States in the context of the Committee, through improved international collaboration, and including recommendations directed towards the implementation of the guidelines relating to space weather in the Guidelines for the Long-term Sustainability of Outer Space Activities. That draft final report would be submitted for the consideration of the Subcommittee at its fifty-ninth session.

165. The Subcommittee requested the Secretariat to submit the draft final report of the Expert Group in all official languages of the United Nations for consideration by the Subcommittee at its fifty-ninth session, in order to promote the engagement of all member States.

## IX. Near-Earth objects

166. In accordance with General Assembly resolution [75/92](#), the Scientific and Technical Subcommittee considered agenda item 11, entitled “Near-Earth objects”.

167. The representatives of Canada, China, Iran (Islamic Republic of), Israel, Italy, Japan, Mexico and the United States made statements under agenda item 11. 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.

168. The following presentations were made under the item:

(a) “Achievements of Hayabusa2: unveiling the world of asteroids through interplanetary round-trip technology”, by the representative of Japan;

(b) “Near-Earth space observation activity of Ukraine in 2020”, by the representative of Ukraine.

169. The Subcommittee had before it a conference room paper containing a summary by SMPAG of the report of its Ad-Hoc Working Group on Legal Issues on the topic “Planetary defence: legal overview and assessment” (A/AC.105/C.1/2021/CRP.10).

170. The Subcommittee heard status reports by IAWN and SMPAG and noted with appreciation the efforts being made by those entities to share information with regard to discovering, monitoring and physically characterizing potentially hazardous near-Earth objects and with regard to potential mitigation efforts by space missions, in order to ensure that all nations, in particular developing countries with limited capacity to predict and mitigate the impacts of near-Earth objects, were aware of potential threats.

171. The Subcommittee noted that nearly 39.5 million observations of asteroids and comets had been collected in 2020 by the worldwide network of astronomical observatories, based in more than 40 countries. It also noted that the number of known near-Earth objects was 25,647 as at 17 April 2021, of which a record number of 2,959 such objects had been discovered in 2020, and that 2,180 asteroids were currently catalogued, whose orbits had brought them within 8 million kilometres of Earth’s orbit. In that regard, the Subcommittee also noted that, despite those numbers, it was estimated that only about 40 per cent of the near-Earth objects of significant size had been identified.

172. The Subcommittee noted the further progress and milestones achieved in asteroid observation missions. For example, the samples from the JAXA sample return mission Hayabusa2 had been brought back to Earth successfully in December 2020 in an amount greatly exceeding the target yield, and the Hayabusa2 mission had extended its mission to explore asteroid 1998 KY26.

173. The Subcommittee noted that the sample return mission OSIRIS-REx of the National Aeronautics and Space Administration (NASA) of the United States, an international mission carried out in cooperation with Canada, France and Japan, had successfully completed its collection of a sample from the surface of the asteroid Bennu in October 2020 and would deliver the sample to Earth in 2023.

174. The Subcommittee noted that the comet NEOWISE had been discovered by the NEOWISE mission of NASA on 27 March 2020 and had become visible to the naked eye in the summer of 2020, putting on a dazzling display for both astronomers and the public worldwide.

175. The Subcommittee noted a number of national efforts and activities aimed at developing capabilities in the discovery, observation, early warning and mitigation of potentially hazardous near-Earth objects, and also noted that it was important to strengthen international collaboration and share information in that regard so that all countries, in particular those with limited capacity for predicting and mitigating the impacts of near-Earth objects, were aware of potential threats. In that regard, the Subcommittee noted the importance of contributing to the work of IAWN and SMPAG.

176. The Subcommittee noted that the IAWN steering committee had held its twelfth meeting on 30 and 31 March 2021. There were currently 30 signatories to the IAWN Statement of Intent, representing observatories and space institutions in Brazil, Canada, China, Colombia, Croatia, France, Israel, Italy, Latvia, Mexico, the Republic of Korea, the Russian Federation, Spain, the United Kingdom and the United States, as well as European international organizations.

177. The Subcommittee noted that, from late 2020 until the first quarter of 2021, IAWN had conducted a coordinated campaign to observe the potentially hazardous asteroid 99942 Apophis, as a last opportunity before 2029, when 99942 Apophis would come to within 40,000 km of Earth, representing the first observed approach of such a large asteroid (approximately 340 meters in diameter) at such a close distance. In that regard, the Subcommittee noted that the campaign had been intended to test global observation and modelling capabilities, with contributions by the signatories to the IAWN Statement of Intent and others, and that, in addition, radar observations during the campaign had helped to determine that 99942 Apophis posed no threat of impacting Earth in the next century and that it could therefore be removed from the ESA and NASA risk lists.

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

179. The Subcommittee noted that, since the previous session of the Subcommittee, SMPAG had held two meetings, its fifteenth meeting, on 24 September 2020, and its sixteenth meeting, on 24 and 25 March 2021, which had been chaired by ESA and supported by the Office for Outer Space Affairs, as the 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 [www.smpag.net](http://www.smpag.net)).

180. The Subcommittee noted that SMPAG currently had 19 members and six permanent observers, and invited others who wished to contribute to the work of SMPAG to express their interest in becoming SMPAG members by addressing a letter to the Chair of SMPAG, also providing a copy to the SMPAG secretariat.

181. The Subcommittee noted that SMPAG, at its fifteenth and sixteenth meetings, had exchanged information on the ongoing and planned activities of its members related to planetary defence, at both the technical and the policy level, and had been briefed on, inter alia, the ongoing sample return missions Hayabusa2 and OSIRIS-REx, as well as the Double Asteroid Redirection Test (DART) mission of NASA and the Hera mission of ESA, the first missions ever undertaken to test the viability and efficiency of the use of a kinetic impactor as a technique for deflecting near-Earth objects. In addition, SMPAG had agreed on a statement in support of small-class, high-velocity flyby missions to small bodies for planetary defence purposes.

182. The Subcommittee noted that SMPAG had proposed the idea of performing an exercise aimed at testing its real-world capabilities to support planetary defence in the case of an actual threat, and that the Italian Space Agency would organize a splinter meeting to evaluate the proposal, define timelines for the exercise and identify contributing agencies.

183. The Subcommittee noted that the seventh International Academy of Astronautics (IAA) Planetary Defence Conference would be held in a virtual format from 26 to 30 April 2021, in conjunction with the current session of the Subcommittee, and would be hosted by the Office for Outer Space Affairs, in cooperation with ESA, and that the eighth IAA Planetary Defence Conference was planned to be hosted by the Office for Outer Space Affairs at the Vienna International Centre in 2023, in cooperation with its partners and the host country, Austria.

184. The Subcommittee noted that the next meeting of the IAWN steering committee was planned to be held in October 2021 in a virtual format, and that the next meeting of SMPAG was planned to be held on 13 and 14 October 2021 in a virtual format.

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

185. In accordance with General Assembly resolution [75/92](#), the Subcommittee considered agenda item 12, entitled “Long-term sustainability of outer space activities”.

186. The representatives of Algeria, Australia, Austria, Belgium, Brazil, Canada, China, France, Germany, India, Indonesia, Iran (Islamic Republic of), Israel, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, the Russian Federation, South Africa, Spain, Switzerland, the United Arab Emirates, the United Kingdom, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 12. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

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

(a) “ELSA-d: building a stable and sustainable future in space”, by the representative of the United Kingdom;

(b) “The For All Moonkind Moon Registry: dynamically advancing the sustainability of lunar activities”, by the observer for For All Moonkind.

188. The Subcommittee had before it the following:

(a) Conference room paper entitled “Implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space: Belgium” (A/AC.105/C.1/2021/CRP.12);

(b) Conference room paper entitled “United Kingdom: update on our reporting approach for the voluntary implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities” (A/AC.105/C.1/2021/CRP.16);

(c) Conference room paper containing a proposal by Australia, Belgium, Canada, France, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Nigeria and the United States on terms of reference, methods of work and a workplan for the establishment of a new working group on the long-term sustainability of outer space activities of the Scientific and Technical Subcommittee (A/AC.105/C.1/2021/CRP.19 and A/AC.105/C.1/2021/CRP.19/Rev.1).

189. The Subcommittee recalled that the Committee, 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 agreed that the bureau of the working group would be elected at the beginning of the fifty-seventh session of the Subcommittee ([A/74/20](#), para. 166). The Committee had also decided that the working group would agree on its own terms of reference, methods of work and dedicated workplan at the fifty-seventh session of the Subcommittee ([A/74/20](#), para. 167).

190. The Subcommittee also recalled that, at its fifty-seventh session, in February 2020, it had not been able to elect the bureau of the working group under the agenda

item on the long-term sustainability of outer space activities, that the working group had therefore not convened meetings at that session, and that the terms of reference, methods of work and workplan had not been developed (A/AC.105/1224, para. 195). At the same session, the delegation of South Africa had expressed its willingness to facilitate informal consultations on the margins of the sixty-third session of the Committee (A/AC.105/1224, para. 197).

191. The Subcommittee further recalled that, owing to extraordinary circumstances, the sixty-third session of the Committee had been cancelled and a decision had been taken by written procedure that the bureau of the working group under the agenda item on the long-term sustainability of outer space activities should be elected at the beginning of the fifty-eighth session of the Subcommittee, and that the working group should also agree on its own terms of reference, methods of work and dedicated workplan at the fifty-eighth session (A/75/20, para. 24).

192. The Subcommittee noted that, taking into consideration the ongoing global COVID-19 pandemic and the consequent extraordinary arrangements for the fifty-eighth session of the Subcommittee, South Africa had confirmed to the Secretariat its willingness to continue to facilitate informal consultations on the matter of the bureau and had expressed its desire to engage informally with States members of the Committee in a virtual format in the intersessional period. Informal consultations had therefore been arranged and had been held virtually on 17 December 2020 and on 19 February, 16 and 31 March and 12 April 2021, with Pontsho Maruping (South Africa) as facilitator.

193. The Subcommittee noted that informal consultations on the election of the bureau had also been held during the present session, with Pontsho Maruping again serving as facilitator. The Subcommittee expressed its appreciation to South Africa for facilitating informal consultations both in the intersessional period and during the present session.

194. The Subcommittee, recognizing that all nominees that had been put forward for bureau membership were highly qualified, noted with appreciation that, in demonstrations of utmost flexibility and with a view to moving forward with substantive work on the important topic, Japan and Switzerland had, in the intersessional period, and the United Arab Emirates had, during the present session, withdrawn their nominations for the bureau.

195. At its 949th meeting, the 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 under agenda item 12.

196. The Subcommittee recommended that the Committee make arrangements that would afford the Working Group on the Long-term Sustainability of Outer Space Activities the opportunity to meet at the sixty-fourth session of the Committee, with the benefit of interpretation services.

197. The Subcommittee was informed by some delegations 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. Those measures included, inter alia, the review and updating of relevant domestic legislation, including through surveys and national research and working groups; the ratification of relevant international treaties; the issuance of pre-launch notifications; the enhanced registration of space objects; national research and development programmes; continued improvements to government and commercial space situational awareness capabilities to detect, track and identify both active space objects and debris; the development of active space debris removal and on-orbit satellite servicing missions; the activities of start-ups addressing space debris; the investigation by companies of new technologies to accelerate the de-orbiting of satellites; collaboration between universities and industry to develop innovative space debris monitoring and collision mitigation technologies; and new government-private

sector partnerships to increase communication, exchange data and establish best practices for autonomous spacecraft collision avoidance.

198. The Subcommittee was also informed by some delegations of various initiatives linked to the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee, including their implementation. Those were, among others, the Network for Space Object Tracking and Analysis (NETRA) of India; the Australian Space Situational Awareness Roadmap, informed by a technical advisory group that included subject matter experts from government, industry and academia; the Real-time Space Debris Surveillance website of the National Institute of Aeronautics and Space (LAPAN) of Indonesia; the space safety programme of the European Space Agency (ESA); the European Union space surveillance and tracking (EU SST) initiative; the collaboration between New Zealand and a commercial radar tracking service provider focused on objects in low Earth orbit to create a space regulatory and sustainability platform; the publication of the *NASA Spacecraft Conjunction Assessment and Collision Avoidance Best Practices Handbook*; the UNISpace Nanosatellite Assembly and Training capacity-building programme of the Indian Space Research Organization (ISRO); the National Space Legislation Initiative of the Asia-Pacific Regional Space Agency Forum; a workshop co-organized by Finland and Switzerland at the European level on implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities; training and capacity-building opportunities offered through the regional centres for space science and technology education, affiliated to the United Nations; a space sustainability initiative of the Office for Outer Space Affairs, funded by the United Arab Emirates Space Agency; and the project of the Office for Outer Space Affairs entitled “The Promoting Space Sustainability Project: awareness-raising and capacity-building related to the implementation of the LTS Guidelines”, funded by the United Kingdom Space Agency.

199. Some delegations expressed the view that the inability of the Subcommittee to more quickly resolve the purely technical issue of the formation of the bureau of the new Working Group on the Long-term Sustainability of Outer Space Activities had prevented the initiation of important information-sharing on the implementation of the already adopted Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee, not to mention the development of new guidelines.

200. Some delegations expressed the view that the proposal put forth in document A/AC.105/C.1/2021/CRP.19/Rev.1 offered a balanced and pragmatic solution for the terms of reference, methods of work and workplan of the new working group.

201. Some delegations expressed the view that the implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee should strengthen capacity-building efforts aimed at bridging the space technology divide between developed and emerging countries.

202. The view was expressed that national implementation of the existing Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee would reinforce the role of the Committee as the most effective multilateral forum for the advancement of practical cooperation in the peaceful uses and exploration of outer space for the benefit of all.

203. The view was expressed that it was now time to “turn paper into practice” by applying and testing the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee to ensure the sharing of best practices, support the capacity-building needs of nations and develop a better understanding of what would be required in the future, so as to ensure that the Committee remained a relevant platform for defining the global governance of outer space activities.

204. The view was expressed that some of the identified challenges of implementing the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee included balancing the implementation of sustainability measures with

efforts to maintain commercial viability, and the need for more mature space debris mitigation technology, such as propulsion for small satellites.

205. The view was expressed that experiences and feedback from, and the involvement of, private sector entities in work on the topic would be beneficial, or even essential, for identifying the relevant issues and guaranteeing the greatest possible degree of long-term sustainability of outer space activities.

206. The view was expressed that, as more private actors entered the new space market, it was imperative that States work together to identify challenges to sustainability, and then develop and negotiate solutions, at the same time developing novel approaches, exchanging experiences and developing capacities and capabilities, to ensure that all actors act responsibly, with due regard for the effect of their activities in the present and in the years and decades to come.

207. The view was expressed that the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee should provide sufficient flexibility to guarantee the legitimate right of all States to use space technology as a tool for development.

208. The view was expressed that the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee should be aimed at promoting 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 at highlighting the importance of international cooperation and technology transfer as effective means to promote research programmes and build capacity in countries with emerging space sectors.

209. The view was expressed that inclusive approaches should be taken in work relating to the long-term sustainability of outer space activities, and that related actions should support efforts already under way relating to the African Space Policy.

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

211. The Subcommittee was informed of various views and proposals relating to the future terms of reference, methods of work and workplan of the Working Group on the Long-term Sustainability of Outer Space Activities.

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

212. In accordance with General Assembly resolution [75/92](#), the Subcommittee considered agenda item 13, entitled “Future role and method of work of the Committee”.

213. The representatives of Austria, Brazil, Canada, Chile, China, Indonesia and the Russian Federation made statements under agenda item 13. The observer for IAU also made a statement under the item. During the general exchange of views, statements relating to the item were made by representatives of other member States.

214. The Subcommittee had before it the following:

(a) 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](#));

(b) Conference room paper submitted by Chile, Ethiopia, Jordan, Slovakia, Spain and IAU entitled “Recommendations to keep dark and quiet skies for science and society” ([A/AC.105/C.1/2021/CRP.17](#));

(c) Conference room paper submitted by Canada, Japan and the United States containing a proposal for a single issue/item for discussion at the fifty-ninth session

of the Subcommittee, in 2022, on a general exchange of views regarding satellite system effects upon terrestrial-based astronomy (A/AC.105/C.1/2021/CRP.24).

215. The Subcommittee recalled that, at its sixty-second session, the Committee had decided to introduce a regular item entitled “Future role and method of work of the Committee” on the agendas of both Subcommittees to allow for discussion of cross-cutting issues (A/74/20, para. 321 (h)).

216. The Subcommittee welcomed document [A/AC.105/C.1/L.384](#) as an important basis for further consideration under the multi-year workplan on the governance and method of work of the Committee and its subsidiary bodies. The Subcommittee noted that proposals made by delegations for future measures were presented in that document in order to assist the Committee and its Subcommittees in their considerations.

217. The view was expressed that clearly defined criteria for granting observer status with the Committee to organizations should be developed; that more topics could be prepared and worked through in working groups; that sufficient time should be devoted to working groups, and the schedule of working group meetings should be adapted according to the schedule of the plenary; and that the two Subcommittees should report to each other regularly or hold joint meetings.

218. The view was expressed that the use of new technologies should be explored as a means to streamline the activities of the Subcommittee, that the possibility of adopting voting procedures for procedural matters should be investigated, that there should be a limit to the number of technical presentations per delegation and that presentations should be delivered outside of formal meetings, and that the use of electronic forms for the collection of information in preparation for sessions of the Committee and its Subcommittees should be considered.

219. The view was expressed that mandates of working groups should be reviewed every five years, that working groups should be allowed to span both Subcommittees on cross-cutting discussions, that technical presentations should be held over lunch for no more than one hour and that the last hour of interpretation time each day should be allocated to presentations requiring interpretation, and that the allocation of time slots for technical presentations should be limited.

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

221. The view was expressed that the adoption by the General Assembly of resolutions that address issues under the purview of the Committee, such as the long-term sustainability of outer space activities and space debris, without providing the Committee with an opportunity to discuss or provide views on such resolutions, might erode the responsibilities of the Committee, might not meet the requirements of the relevant resolutions of the Assembly and might distort the division of responsibilities and the coordination and cooperation among different entities within the United Nations system.

222. The view was expressed that the discussion of important topics on the space agenda, such as space debris, should be carried out in the framework of the Committee, that transferring such discussions to parallel platforms focusing on the concept of responsible behaviour of States in outer space would have a negative effect on the role of the Committee, that it was important to further strengthen the intergovernmental status of the Committee and that a dialogue with commercial operators, scientific and academic circles should be conducted in such a way as to avoid any form of interference in the work of the Committee.

223. The view was expressed that the role of the Committee should be compliant with global space developments in all areas, including security, and that the resources for the Office for Outer Space Affairs should be adapted to the current rapid increase in space activities and the need for regulations and global coordination.

224. Some delegations expressed the view that the Committee and its Subcommittees were the right international forums to address various implications resulting from the deployment of megaconstellations of satellites and their impacts on astronomy.

225. Some delegations expressed the view that there was a need to further examine and identify the most appropriate mechanism and modalities for further discussion of the topic of dark and quiet skies in the Subcommittee.

226. Some delegations expressed the view that the topic of dark and quiet skies, addressed in document A/AC.105/C.1/2021/CRP.17, should be included as an item on the agenda of the Subcommittee.

227. Some delegations expressed the view that the topic “General exchange of views regarding satellite system effects upon terrestrial-based astronomy” should be included as a single issue/item for discussion on the agenda of the fifty-ninth session of the Subcommittee, as proposed in document A/AC.105/C.1/2021/CRP.24.

228. Some delegations expressed the view that sustainability issues relating to the topic of dark and quiet skies could be considered within the framework of the new working group under the agenda item on the long-term sustainability of outer space activities.

229. The view was expressed that some issues relating to the topic of dark and quiet skies were matters to be addressed by ITU.

230. The view was expressed that some of the issues relating to the topic of dark and quiet skies might be better addressed with the involvement of other bodies, such as ITU, and that future work in that area by IAU, or by industry, could be focused on the development of tools and guidance for satellite operators and regulators for assessing and addressing the reflectivity and brightness of satellites, as well as guidance for astronomers on applying existing space situational awareness data. The delegation expressing that view was also of the view that the Subcommittee could engage in considering the technical aspects of that topic, including in relation to space sustainability.

231. Some delegations expressed the view that there was a need for a more fulsome evaluation of the topic of dark and quiet skies, with the involvement of the scientific community, non-governmental organizations, industry and governments, in particular the regulatory community, with a view to determining the best approach for the consideration of the issue.

232. The view was expressed that any possible legal implications in the area of space law relating to the topic of dark and quiet skies could be assessed by the Legal Subcommittee.

233. The Subcommittee encouraged the Office for Outer Space Affairs to engage with all relevant stakeholders, such as IAU and others, on the matter of dark and quiet skies as it related to the mandate of the Committee and its Subcommittees, and to present the outcomes of that engagement, including findings for furthering the discussion on the matter, to the Subcommittee for consideration at its fifty-ninth session, in 2022. In that regard, the conference on dark and quiet skies for science and society to be organized by the Office jointly with the Government of Spain and IAU, planned to be held in October 2021, could provide input to a focused discussion on opportunities for international cooperation.

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

234. In accordance with General Assembly resolution [75/92](#), the Subcommittee considered agenda item 14, entitled “Use of nuclear power sources”.

235. The representatives of China, Indonesia, Mexico, the Russian Federation, the United Kingdom, the United States and Venezuela (Bolivarian Republic of) made

statements under agenda item 14. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

236. The Subcommittee heard a scientific and technical presentation by the representative of China entitled “Aerodynamic characteristics analysis of radioisotope nuclear sources”.

237. 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 IAEA.

238. The view was expressed that it was important to promote international collaboration with a view to promoting the safe use of nuclear power sources in outer space.

239. 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. Furthermore, the Safety Framework allowed for States and international intergovernmental organizations to devise new approaches based on the expansion of knowledge and best practices gained from experience, and therefore continuously improve safety. The delegation expressing that view was also of the view that, to date, the Working Group on the Use of Nuclear Power Sources in Outer Space had not identified any challenges to implementing the Safety Framework that would require any modifications or additions to it. Thus, 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 seeking to ensure the safe development and use of nuclear power in space.

240. The view was expressed that the widespread adoption of the Safety Framework would provide assurance to the global community that space nuclear power source applications would continue to be developed, launched and used in a safe manner, and therefore the implementation at the national level of the Safety Framework should be strongly encouraged.

241. The view was expressed that relevant documents developed under the auspices of the United Nations assisted greatly in the drafting and implementation at the national level of norms relating to the safety of nuclear power sources in outer space, and that the Principles and the Safety Framework, when applied jointly, constituted a sufficient tool for States and international organizations that were planning to develop space nuclear power source applications and use them in strict observance of those instruments and comprehensive security measures. The delegation expressing that view was also of the view that currently there was no need to revise the Principles or the Safety Framework.

242. The view was expressed that, since 1961, nuclear power source applications had been playing a critical role in the exploration of space, enabling missions of scientific discovery to destinations across the solar system, and that their use would be continued on some future space missions.

243. The view was expressed that space activities continued to be of great importance for accomplishing a wide range of promising energy-intensive tasks facing humanity, and that basic research in near and deep space was therefore inextricably linked with the use of nuclear power sources on spacecraft. The delegation expressing that view underlined that nuclear power could be used to accomplish a wide range of promising energy-intensive tasks in near and deep space and make it possible to reach a more advanced level in the development of space activities.

244. The view was expressed that the effects of space nuclear power sources on human life and the environment were still not entirely known, and thus such highly dangerous sources of energy could not be substituted for other sources of energy that could satisfactorily serve the needs of telecommunications, telemedicine, Earth observation and other space-based applications. The delegation expressing that view was also of the view that States were responsible for preserving life and maintaining peace in outer space, and thus they needed to engage in promoting the use of safe and efficient sources of energy while developing and promoting binding standards for the use of space nuclear power source applications, including through their involvement in the Legal Subcommittee.

245. In accordance with paragraph 5 of General Assembly resolution [75/92](#), the Subcommittee, at its 935th meeting, on 19 April, reconvened its Working Group on the Use of Nuclear Power Sources in Outer Space, with Sam A. Harbison (United Kingdom) as Chair.

246. The Working Group on the Use of Nuclear Power Sources in Outer Space held three meetings. At its 950th meeting, on 28 April, the Subcommittee endorsed the report of the Working Group, which is contained in annex II to the present report.

### XIII. Space and global health

247. In accordance with General Assembly resolution [75/92](#), the Subcommittee considered agenda item 15, entitled “Space and global health”.

248. The representatives of China, India, Indonesia, Israel, Japan, Mexico, Peru, South Africa and the United States 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.

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

(a) “Australian initiatives in digital health during the pandemic crisis and after”, by the representative of Australia;

(b) “Spatial information technology and disease prevention and control in China”, by the representative of China;

(c) “Space chemistry and global health: drug development against COVID-19 in space”, by the representative of Hungary;

(d) “Space technology applications in India with relevance to COVID-19”, by the representative of India;

(e) “Space medicine for Earth medicine: 60 years since the first human space flight”, by the representative of the Russian Federation;

(f) “Copernicus and COVID-19: the European Union Earth Observation Programme initiatives”, by the observer for the European Union;

(g) “Thromboembolism in space and its implications on COVID-19 research on Earth”, by the observer for CANEUS International;

(h) “An evaluation of Earth observation as a potential tool to forecast and manage resources during the COVID-19 pandemic”, by the observer for SGAC;

(i) “The role of space during pandemics”, by the observer for ISU.

250. The Subcommittee had before it the following:

(a) Responses to the set of questions regarding policies, experiences and practices in the use of space science and technology for global health (see [A/AC.105/C.1/119](#), [A/AC.105/C.1/119/Add.1](#), [A/AC.105/C.1/119/Add.2](#), [A/AC.105/C.1/119/Add.3](#), [A/AC.105/C.1/2021/CRP.21](#) and [A/AC.105/C.1/2021/CRP.25](#));

(b) Conference room paper containing a note by the Secretariat entitled “Review of responses to the set of questions on the policies, experiences and practices in the use of space science and technology for global health” (A/AC.105/C.1/2021/CRP.7);

(c) Conference room paper containing a working paper by the Chair of the Working Group on Space and Global Health entitled “Draft recommendations on the policies, experiences and practices in the use of space science and technology for global health” (A/AC.105/C.1/2021/CRP.8).

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

252. 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.

253. The Subcommittee noted with concern the extraordinary situation, with global implications, created by the COVID-19 pandemic, which has spread all around the globe in just a few months and affected, inter alia, societies and their health, the economy, tourism, sports and culture in an unprecedented way.

254. 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 support of contact tracing, the identification of affected areas, modelling the spread of the disease and monitoring its transmission, connectivity for remote working, tele-health and communication, as well as methods of coping with social isolation.

255. Pursuant to paragraph 5 of General Assembly resolution [75/92](#), the Subcommittee, at its 935th meeting, on 19 April, reconvened its Working Group on Space and Global Health, with Antoine Geissbühler (Switzerland) as Chair.

256. At its 950th meeting, on 28 April, the Subcommittee endorsed the report of the Working Group on Space and Global Health, which is contained in annex III 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**

257. In accordance with General Assembly resolution [75/92](#), the Subcommittee considered agenda item 16, 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.

258. The representatives of China, India, Indonesia, Iran (Islamic republic of), Kenya, the Netherlands, Pakistan, the Russian Federation and South Africa made statements under agenda item 16. 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.

259. In accordance with the invitation extended by the Subcommittee at its fifty-seventh session, in 2020 (A/AC.105/1224, para. 250), 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 2020 of the Radiocommunication Bureau of ITU on the use of the geostationary satellite orbit and other orbits (see [www.itu.int/en/ITU-R/space/snl/Pages/reportSTS.aspx](http://www.itu.int/en/ITU-R/space/snl/Pages/reportSTS.aspx)), as well as other documents referred to in conference room paper A/AC.105/C.1/2021/CRP.13. The Subcommittee invited ITU to continue to submit reports to it.

260. 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 position 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.

261. 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 be 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.

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

263. Some delegations expressed the view that the geostationary orbit, as a limited natural resource clearly in danger of saturation, must be used rationally, efficiently, economically and equitably. That principle was deemed fundamental to safeguarding the interests of developing countries and, in particular, countries with a certain geographical position, as set out in article 44, paragraph 196.2, of the Constitution of ITU, as amended by the Plenipotentiary Conference held in Minneapolis, United States, in 1998. The delegations expressing that view were also of the view that the geostationary orbit should be governed by a special legal framework with the purpose of defending the interests of developing countries, in particular equatorial countries.

264. Some delegations expressed the view that, while future 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 in which they operated, and hence there was a need to preserve the geostationary orbit region. The active development of such megaconstellations would also create a number of significant problems, such as radio frequency interference and overpopulation of orbits, and thus the matter should be expediently addressed by States, within both ITU and the Subcommittee.

265. The view was expressed that it had become difficult for new space actors to obtain proper orbit and frequency rights for locations in the geostationary orbit, owing to the high saturation of that orbit. The delegation expressing that view was also of the view that the use of the geostationary orbit was not the only way to obtain access

to space; such access could also be gained by obtaining international orbit and frequency rights from ITU to operate in low Earth orbit or any other orbit where significantly fewer activities involving the development and operation of spacecraft took place, in comparison with the geostationary orbit. Therefore, the Subcommittee should, at future meetings, broaden the scope of the current agenda item to include the low Earth orbit and other orbits.

266. The view was expressed that, despite the numerous and repeated concerns expressed over the years by member States under the agenda item relating to the use of the geostationary orbit, to date, the Subcommittee had not developed any practical solutions to address those concerns. It was therefore not sufficient to merely note or record those concerns, and the Subcommittee needed to take serious action towards a practical solution. In that regard, the delegation expressing that view drew the attention of the Subcommittee to the fact that, under the current regime for the utilization of the geostationary orbit, there were no specific criteria for ensuring equitable access to it for all States.

267. Some delegations made a proposal to the Subcommittee to establish a sub-item under the agenda item relating to the use of the geostationary orbit, dedicated to the analysis of the current status of the utilization of the geostationary orbit from the perspective of equitable access, in order to identify deficiencies in the current regime regulating its use. The establishment of such a sub-item would give countries, in particular developing countries, an opportunity to elaborate on why the equitability of access to the geostationary orbit was in question, and why the current regime was not capable of ensuring such access. Although the matter clearly fell under the competence of the ITU Radiocommunication Sector, nothing prevented the Subcommittee from actively contributing to the resolution of the problem and offering practical solutions. The views of those delegations were also more broadly elaborated in conference room paper A/AC.105/C.1/2021/CRP.26.

268. The view was expressed that the decisions relating to the geostationary orbit taken at the World Radiocommunication Conference 2019 (WRC-19), held in Sharm el-Sheikh, Egypt, from 28 October to 22 November 2019, would contribute to the realization of the key principle, namely, equitable access to the orbital and frequency resources of the geostationary orbit for all interested members of ITU, as well as allow the efficient use of those resources, taking into particular account the needs and interests of developing countries.

269. Some delegations expressed the view that, in order to ensure the sustainability of the geostationary orbit, as well as to assure guaranteed and 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 and to explore them further, through the creation of appropriate working groups and legal and technical intergovernmental panels, as necessary.

## **XV. Draft provisional agenda for the fifty-ninth session of the Scientific and Technical Subcommittee**

270. In accordance with General Assembly resolution [75/92](#), the Subcommittee considered agenda item 17, entitled “Draft provisional agenda for the fifty-ninth session of the Scientific and Technical Subcommittee”.

271. The representatives of Brazil, Canada, Chile, China, France, Germany, Iran (Islamic Republic of), Japan, Mexico, the Netherlands, Pakistan, the Russian Federation, Sweden, the United Kingdom and the United States made statements under agenda item 17. The observer for the European Union made a statement. Additional statements were made by the observers for ESO and IAU.

272. The Subcommittee noted that the Secretariat had scheduled its fifty-ninth session to be held from 7 to 18 February 2022.

273. The Subcommittee agreed that the following items be proposed to the Committee for inclusion in the agenda of the Subcommittee at its fifty-ninth session:

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.

(Work for 2022 as reflected in the extended multi-year workplan of the Working Group on the Use of Nuclear Power Sources in Outer Space (see para. 246 above and annex II, para. 5)

16. Space and global health.  
(Work for 2022 as reflected in the multi-year workplan of the Working Group on Space and Global Health ([A/AC.105/1202](#), annex III, para. 5, and appendix I))
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.  
(Single issue/item for discussion)
18. Draft provisional agenda for the sixtieth session of the Scientific and Technical Subcommittee.
19. Report to the Committee on the Peaceful Uses of Outer Space.

274. The Subcommittee agreed that the industry symposium to be organized by the Office for Outer Space Affairs at the fifty-ninth session of the Subcommittee should be on the topic of dark and quiet skies.

## Annex I

### Report of the Working Group of the Whole

1. In accordance with paragraph 5 of General Assembly resolution [75/92](#), the Scientific and Technical Subcommittee, at its fifty-eighth session, reconvened its Working Group of the Whole.
2. From 21 to 28 April 2021, the Working Group held three meetings, with Umamaheswaran R. (India) as Acting Chair in the absence of the Chair, P. Kunhikrishnan (India).
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 fifty-ninth 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 noted that the measures agreed on by the Working Group of the Whole at the fifty-seventh session of the Scientific and Technical Subcommittee ([A/AC.105/1224](#), annex I, para. 7) would be implemented at the fifty-ninth session of the Subcommittee, in 2022, and had not been implemented at the present fifty-eighth session of the Subcommittee, owing to the extraordinary situation with regard to the COVID-19 pandemic, which had warranted a hybrid (in-person and virtual) format.
6. The Working Group agreed that the Secretariat should submit to the Committee for consideration at its sixty-fourth session, in 2021, further information on the potential use of webcasting for open meetings, and on the availability of a daily list of speakers for the benefit of delegations.
7. The Working Group noted that, in accordance with General Assembly resolution [75/92](#), the Scientific and Technical Subcommittee would submit to the Committee its proposal for the draft provisional agenda for the fifty-ninth session of the Subcommittee, to be held in 2022. The Working Group agreed that the draft provisional agenda was to be considered by the Subcommittee under item 17 of its agenda.
8. At its 3rd meeting, on 28 April, the Working Group adopted the present report.

## Annex II

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

1. In accordance with paragraph 5 of General Assembly resolution [75/92](#), the Scientific and Technical Subcommittee, at its 935th meeting, on 19 April 2021, 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 recalled the following objectives of its multi-year workplan for the period 2017–2021, adopted by the Subcommittee at its fifty-fourth session, in 2017 ([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, which were discussed during its formal and informal meetings:

(a) Working paper entitled “Experience in the practical application of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space and the Safety Framework for Nuclear Power Source Applications in Outer Space”, prepared by the Russian Federation ([A/AC.105/C.1/L.388](#));

(b) Working paper entitled “Updated and risk-informed process for launching space nuclear systems in the United States of America”, prepared by the United States ([A/AC.105/C.1/L.389](#));

(c) Document entitled “Updated preliminary analysis of how the Principles Relevant to the Use of Nuclear Power Sources in Outer Space contribute to the safety of space nuclear power source applications”, prepared by Italy, France, the United Kingdom and ESA ([A/AC.105/C.1/L.390](#));

(d) 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](#)).

4. The Working Group recalled that, in accordance with its workplan, in 2020, it had been necessary to determine whether the current workplan should be extended and, if it was not to be extended, to prepare a draft report summarizing the technical presentations received and the challenges identified during the course of the workplan and identifying potential enhancements to the technical content and scope of the Principles. In that connection, the Working Group recalled with satisfaction that during 2020 it had held a number of informal virtual meetings to meet the objectives of the workplan for that year and had been able to make good progress in developing a draft report to the Subcommittee on the outcome of its work under the current workplan ([A/AC.105/C.1/L.391](#)), while also considering the possibility of extending the workplan.

5. On the basis of its deliberations during 2020, as well as at the formal and informal meetings held 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. The Working Group therefore recommended that the current multi-year workplan be extended to 2022, as follows:

2022 Finalize the report to the Subcommittee on the outcome of the multi-year workplan.

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 intersessional meetings. Furthermore, the Working Group felt that it would be highly desirable to hold a meeting on the margins of the sixty-fourth session of the Committee, which was planned to be held from 25 August to 3 September 2021.

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 3rd meeting, on 28 April, the Working Group adopted the present report.

## Annex III

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

1. In accordance with paragraph 5 of General Assembly resolution [75/92](#), the Scientific and Technical Subcommittee, at its fifty-eighth session, reconvened its Working Group on Space and Global Health.
2. From 21 to 28 April 2021, the Working Group held four meetings, with Antoine Geissbühler (Switzerland) as Chair.
3. The Working Group had before it the documents listed in paragraph 250 of the report of the Subcommittee on its fifty-eighth 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 20 and 23 April, on the margins of the session.
5. The Working Group also noted with appreciation the presentation entitled “Advances in space medicine applied to pandemics on Earth”, delivered in the context of the informal consultations. The applicability and possible benefits on Earth of space activities and innovation were well noted as considerations to guide pandemic preparedness and health emergency response in the future.
6. The Working Group recalled the following activities for 2021 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 the draft set of recommendations presented by the Chair of the Working Group on current uses of space (technology, applications, practices and initiatives) in support of global health;
  - (b) Chair of the Working Group to submit a first draft of the report of the Working Group to the Subcommittee and a corresponding draft resolution to be submitted to the General Assembly.
7. The Working Group agreed on the following recommendations regarding policies, experiences and practices in the use of space science and technology for global health, prepared by the Chair of the Working Group on Space and Global Health:

*Policy development for strengthened collaboration between the space and global health sectors*

**Recommendation 1.** United Nations entities, intergovernmental organizations and national Governments are encouraged to pursue effective coordination in all key space activities relevant to global health, including telecommunications, global navigation satellite systems, remote sensing and geographic information systems, and space life science and technology development.

**Recommendation 2.** Formal cooperative agreements are encouraged between health authorities and space authorities at the national level.

**Recommendation 3.** Member States are encouraged to establish policy-enabled environment and governance mechanisms, with due consideration of legal and ethical issues, for removing barriers to the effective use of space-based technologies, including telemedicine solutions.

*Policy development for strengthened data accessibility and sharing*

**Recommendation 4.** Member States are encouraged to promote open data-sharing policies and participatory approaches to developing and improving access to all geospatial information relevant to global health, whenever possible.

**Recommendation 5.** Member States are encouraged to enable organizational and technical interoperability to facilitate the development and implementation of space-based science and technology in the health sector.

*Development and implementation of applications of space solutions for global health*

**Recommendation 6.** United Nations entities and intergovernmental organizations should support the wider development and application of space solutions for global health, public health and the individual health needs of Member States. This could be achieved by encouraging the implementation of a broader range of space solutions for sustainable development and could include public-private partnerships.

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

**Recommendation 8.** Member States are encouraged 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.

*Knowledge management and sharing*

**Recommendation 9.** A dedicated platform should be established for effective coordination on space and global health issues among United Nations entities, other international organizations and relevant actors.

**Recommendation 10.** All key activities, reference documents and plans relevant to space for global health activities by United Nations entities should be monitored and compiled, including those of the World Health Organization and other international organizations, States members of the Committee as well as, as far as possible, non-governmental organizations and other non-governmental actors. The annual compilation of activities will serve as a reference to identify and discuss gaps and opportunities and will be shared broadly in an effort to raise awareness and promote cooperation among relevant actors in this domain.

**Recommendation 11.** An engagement strategy should be developed to analyse and assess current actors' roles and interests in the domain of space and global health. The engagement strategy is expected to be used to help to promote synergy, complementarity, cooperation and coordination among all actors.

*Capacity-building activities*

**Recommendation 12.** Intersectoral coordination and cooperation should be enhanced 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. Actors engaging in such activities should consider follow-up mechanisms aimed at strengthening the sustainability of the activities.

**Recommendation 13.** Member States are encouraged 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.

**Recommendation 14.** Capacity-building events, to be organized by United Nations entities and other relevant actors, should be promoted, with the objective of further promoting awareness of and engagement with regard to the important contribution of space science and technology among actors applying the One Health approach. Those efforts will be aimed at increasing the number of organizations and of other actors in the health domain that are actively engaged in using space science and technology.

*Review of the workplan*

**Recommendation 15.** With attention to the broad needs expressed over the years in the field of space and global health and taking into account future evolving needs, including with respect to global pandemics, the Working Group will, at the fifty-ninth session of the Subcommittee, review its terms of reference and consider whether it is necessary to extend its workplan.

8. The Working Group recalled its agreement, reached at the fifty-seventh session of the Subcommittee, in 2020 (A/AC.105/1224, annex III, para. 12), to prepare recommendations as to the role and structure of the globally accessible platform, the establishment of which was recommended under thematic priority 5 (Strengthened space cooperation for global health) of the fiftieth anniversary of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space, and agreed that the Chair of the Working Group should develop the design and a proof of concept of the space and health globally accessible platform.

9. The Working Group noted that the platform would benefit from the experiences and information in the field of space and global health of States members of the Committee, international intergovernmental and non-governmental organizations with permanent observer status with the Committee, United Nations entities, the Group on Earth Observations, the World Organization for Animal Health, the International Federation of Red Cross and Red Crescent Societies and Médecins sans frontières.

10. The Working Group agreed that a series of intersessional meetings would be necessary for advancing the work on the globally accessible platform and for preparing the activities scheduled for the final year of the workplan of the Working Group. In that connection, the Working Group requested the Secretariat to facilitate the scheduling, preparation and holding of those intersessional meetings.

11. The Working Group requested the Secretariat to invite States members of the Committee that have not done so to provide the details of national points of contact for the Working Group.

12. 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.

13. The Working Group noted that an informal online meeting of the Working Group had been held on 12 June 2020 in response to the COVID-19 pandemic.

14. At its 4th meeting, on 28 April, the Working Group adopted the present report.

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