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

Draft report

I. Introduction

D. General statements

1. Statements were made by representatives of the following member States during the general exchange of views: Algeria, Angola, Argentina, Australia, Austria, Brazil, Canada, Chile, China, Colombia, Costa Rica, Cuba, Czechia, Egypt, Finland, France, India, Indonesia, Iran (Islamic Republic of), Israel, Italy, Japan, Kenya, Luxembourg, Malaysia, Netherlands, New Zealand, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, Singapore, Slovakia, Slovenia, South Africa, Spain, Switzerland, Thailand, United Kingdom, United States and Venezuela (Bolivarian Republic of). A statement was made by the representative of Morocco on behalf of the Group of 77 and China. The representative of the European Union, in its capacity as observer, made a statement on behalf of the European Union and its member States. The representative of Egypt made a statement on behalf of the Group of African States. Additional statements were made by the observers for APSCO, CANEUS International, ESA, ESO, For All Moonkind, IAF, ISU, the Moon Village Association, the National Space Society, the Open Lunar Foundation, PSIPW, the Square Kilometre Array Observatory, SGAC, SWF, UNISEC-Global and WSWA. Statements were also made by the observers for the Association for the Development of the Atlantic International Research Centre and The Hague Institute for Global Justice.

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

(a) “World Space Week 2022: space and sustainability”, by the observer for WSWA;

(b) “Space for women: activities and contributions of the Republic of Korea”, by the representative of the Republic of Korea;

(c) “White paper: China’s space 2021”, by the representative of China;

(d) “Introduction of the United Nations/China Global Partnership Workshop on Space Exploration and Innovation”, by the representative of China;

(e) “James Webb Space Telescope: discovering the universe”, by the representative of the United States;



- (f) “Update on the Consortium for Execution of Rendezvous and Servicing Operations”, by the representative of the United States;
- (g) “Eurasian space educational centre”, by the representative of the Russian Federation;
- (h) “James Webb Space Telescope: the challenge of the Near-Infrared Spectrograph design”, by the observer for ESA;
- (i) “Landsat’s fiftieth anniversary: looking back, and looking ahead”, by the representative of the United States;
- (j) “Pilot space programme for schools”, by the representative of Chile;
- (k) “Latest developments regarding regulation and space flight from the United Kingdom”, by the representative of the United Kingdom;
- (l) “Passive Reflectometry and Dosimetry (PRETTY): a nanosatellite mission for altimetry and dosimetry”, by the representative of Austria;
- (m) “Moon Village Association and International Moon Day highlights”, by the observers for the Moon Village Association;
- (n) “Kids2Mars, a global, inclusive educational project regarding the planet Mars and its exploration by human and non-human space missions”, by the representative of Brazil;
- (o) “SABIA-Mar satellite mission”, by the representative of Argentina;
- (p) “Current status of the Scientific Committee on Solar-Terrestrial Physics PRESTO programme for predictability of the variable solar-terrestrial coupling”, by the observer for the Scientific Committee on Solar-Terrestrial Physics;
- (q) “Recent activities of PSIPW”, by the observer for PSIPW;
- (r) “Development of a rocket powered by a detonation engine”, by the representatives of Poland;
- (s) “Update on the status of space solar power development”, by the observer for the National Space Society.

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

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

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

established, emerging and non-spacefaring nations. She further noted the report of the Secretary-General entitled “Our Common Agenda” (A/75/982), in which the peaceful, secure and sustainable use of outer space and actions related to those objectives constituted an important pillar. In that context, she noted that a high-level, multilateral Summit of the Future was envisaged to be held in September 2023 to advance ideas for governance arrangements in the areas of international concern mentioned in the report. The Director further announced that she would be leaving the Office in the coming month.

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

7. The Subcommittee noted with satisfaction the adoption by the General Assembly of its resolution 76/3, entitled “The ‘Space2030’ Agenda: space as a driver of sustainable development”, and recalled that the “Space2030” Agenda would contribute to enhancing and raising awareness of the benefits of space activities and tools for the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals and targets contained therein.

8. 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.

9. 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.

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

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

12. 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 to developing countries, the prevention and mitigation of natural disasters and scientific and technological research in developing countries, all within the framework of international cooperation. The delegations expressing that view also emphasized that the only way to ensure the sustainability of outer space activities was to continue to deliver the benefits derived from those activities to humanity as a whole through enhanced cooperation and collaboration, and that States should refrain from promulgating, adopting and applying any unilateral economic, financial and/or trade measures and actions not in accordance with international law and the Charter of the

United Nations that could impede access to space and space activities, particularly in developing countries.

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

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

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

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

VI. Space-system-based disaster management support

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

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

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

- (a) “Integrated application of Earth observations for disaster risk reduction: the international cooperation project and how it supports monitoring under the Sendai Framework for Disaster Risk Reduction”, by the representative of China;
- (b) “Typhoon Rai damage assessment mapping using Sentinel-1 synthetic aperture radar and UNOSAT/UNITAR data”, by the representative of the Philippines.

19. The Subcommittee had before it the following:

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

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

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

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

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

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

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

(d) Project management course on the International Charter on Space and Major Disasters and the mapping of areas affected by floods, earthquakes and landslides with satellite images;

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

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

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

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

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

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

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

26. The Subcommittee noted that while States continued to benefit from or support international initiatives such as the International Charter on Space and Major Disasters, Sentinel Asia and UN-SPIDER, or to collaborate through specialized bodies such as the Committee on Earth Observation Satellites, some States had developed their own disaster management and emergency response procedures that utilized the resources of space agencies and the expertise of other national actors to

implement standard operating procedures and provided early warning, in-time emergency response and post-disaster space-based services such as satellite telecommunications, making use of Earth observation images, spatial information, real-time web applications and technical support by specialists for countries affected by climate change or fires, landslides, floods, tsunamis, drought, volcanic eruptions, earthquakes or oil spills, for maritime search and rescue operations, and for supply disruptions arising from the COVID-19 pandemic.

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

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

IX. Near-Earth objects

29. In accordance with General Assembly resolution [76/76](#), the Scientific and Technical Subcommittee considered agenda item 12, entitled “Near-Earth objects”.

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

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

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

33. The Subcommittee noted that some 38.4 million observations of asteroids and comets had been collected in 2021 by the worldwide network of astronomical observatories, based in more than 40 countries. It also noted that the total number of known near-Earth objects came to 28,340 as at 8 February 2022, of which a record number of 3,097 had been discovered in 2021, and that currently a total of 2,263 catalogued asteroids with approximate diameters of 140 m or more had orbits that brought them within 8 million km of Earth’s orbit. In that regard, the Subcommittee also noted that, although that number seemed high, it was estimated that only about 41 per cent of the near-Earth objects in that size range had been found.

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

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

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

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

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

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

40. The Subcommittee noted that, since the previous session of the Subcommittee, SMPAG had held two meetings: its seventeenth meeting, on 13 and 14 October 2021, and its eighteenth meeting, on 9 and 10 February 2022, chaired by ESA and supported by the Office for Outer Space Affairs as the permanent secretariat to SMPAG pursuant to General Assembly resolution 71/90. The Subcommittee was informed of the progress made in the work of SMPAG, as contained in the summary reports of the meetings (available at <http://smpag.net>).

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

42. The Subcommittee noted that SMPAG, at the meetings held since the last report, had exchanged information on the ongoing and planned activities of its members related to planetary defence, from both a technical and policy standpoint, and had been briefed, *inter alia*, on the ongoing sample return missions Hayabusa2 and OSIRIS-REx and on the DART and Hera missions, intended to test the viability and efficiency of a kinetic impactor as a near-Earth object deflection technique.
43. The Subcommittee noted that SMPAG had initiated its first hypothetical impact threat exercise in 2021, under the lead of ASI and the Polytechnic University of Milan members of SMPAG, to test the Group's real-world capabilities to support planetary defence in the case of a real threat. The Subcommittee noted that the primary objective of that exercise was to simulate a case of a hypothetical threat caused by an asteroid and to focus on SMPAG procedures to develop coordinated advice for a response to such an impact threat. The exercise would run through 2022 and would include technical aspects related to the design of deflection or reconnaissance missions, as well as tasks related to procedural aspects within SMPAG.
44. The Subcommittee also noted an initiative that built on the unique opportunity presented by a close approach by the asteroid 99942 Apophis in 2029 to look at the possibility of organizing a United Nations-designated international year of asteroid impact hazard awareness in 2029, and that a small working group comprising interested members and observers of IAWN and SMPAG had been set up to work on the proposal.
45. The Subcommittee noted that the seventh International Academy of Astronautics Planetary Defense Conference had been held from 26 to 30 April 2021, hosted by the Office for Outer Space Affairs in cooperation with ESA, and that the eighth Planetary Defense Conference was to be held at the Vienna International Centre in 2023, hosted by the Office for Outer Space Affairs in cooperation with its partners and the host country, Austria.
46. The Subcommittee noted that the next meetings of the IAWN steering committee and of SMPAG were planned for September 2022.
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