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Committee on the Peaceful Uses of Outer Space
Scientific and Technical Subcommittee
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Draft report

Addendum

VIII. Space weather

1. In accordance with General Assembly resolution 77/121, the Scientific and Technical Subcommittee considered agenda item 10, entitled "Space weather".

2. The representatives of Algeria, Argentina, Australia, Belgium, Brazil, China, France, India, Indonesia, Iran (Islamic Republic of), Italy, Japan, Kazakhstan, Kenya, Mexico, Nigeria, Pakistan, the Republic of Korea, the Russian Federation, South Africa, Thailand, the United Kingdom and the United States made statements under agenda item 10. The observer for COSPAR 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.

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

(a) "Norwegian space weather activities in the Arctic", by the representative of Norway;

(b) "Space weather – a risk to economic vitality and national security: South Africa's solution", by the representative of South Africa;

(c) "Operating experience of the Russian segment of the China-Russian Federation consortium of the global space weather centre in support of international air navigation", by the representative of the Russian Federation;

(d) "Japanese contribution to space weather research and operation", by the representative of Japan;

(e) "Progress of the space weather operations of the China Meteorological Administration", by the representative of China;

(f) "Study and monitoring of the Earth magnetic field using FASAT Charlie's magnetometer", by the representative of Chile;

(g) "Report on progress following the lead efforts of Committee on Peaceful Uses of Outer Space Activities, COSPAR, WMO and ISES to improve global coordination of space weather activities", by the observer for COSPAR;

(h) “An update on the recent activities of SCOSTEP”, by the observer for SCOSTEP.

4. The Subcommittee had before it the following:

(a) Report on the United Nations/Azerbaijan workshop on the International Space Weather Initiative: the Sun, Space Weather and Geosphere, held in Baku from 31 October to 4 November 2022 (A/AC.105/1275);

(b) Final report of the Expert Group on Space Weather: towards improved international coordination for space weather services (A/AC.105/C.1/122).

5. 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, ground- and space-based infrastructure and aviation activity upon which society increasingly relied. As such, it needed to be addressed in a global manner, through international cooperation and coordination, in order to be able to predict potentially severe space weather events and mitigate their impact to guarantee safety and sustainability of outer space activities.

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

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

8. The Subcommittee noted that activities related to space weather could have an impact on aviation and, in particular, could potentially interrupt high-frequency communications and satellite navigation. In that regard, the Subcommittee noted the importance of the four ICAO global space weather information centres, which were tasked with providing the civil aviation sector with information about space weather that could potentially affect communications, navigation and the health of passengers and crew.

9. Some delegations expressed views on the importance of the implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities, in particular guidelines B.6 and B.7, which concerned the safety of space operations.

10. The view was expressed that in order to improve research and the predictability of space weather, further information-gathering would be beneficial. In that connection, the private sector could contribute to the monitoring of the upper atmosphere and the near-Earth space environment.

11. The Subcommittee expressed its appreciation to the Expert Group on Space Weather for its work and for its final report (A/AC.105/C.1/122) and the recommendations contained therein.

12. The Subcommittee took note of the collaboration between COSPAR, WMO and ISES on space weather coordination efforts, and it noted that the collaboration represented action taken in response to the recommendations contained in the final report of the Expert Group.

13. The Subcommittee noted that the information gathered from member States through a survey led by the Expert Group, which served as the basis of the Expert Group’s final report, would be transferred to WMO to improve international coordination of space weather activities.

IX. Near-Earth objects

14. In accordance with General Assembly resolution 77/121, the Scientific and Technical Subcommittee considered agenda item 11, entitled “Near-Earth objects”.

15. The representatives of Austria, Canada, China, France, Italy, Japan, the Republic of Korea, the Russian Federation 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.

16. The Subcommittee heard a scientific and technical presentation by the representative of Italy on the Light Italian CubeSat for Imaging of Asteroids (LICIACube): the Italian small satellite for the close-up observation of the impact of the Double Asteroid Redirection Test (DART) of the National Aeronautics and Space Administration (NASA) on the asteroid Dimorphos.

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

18. The Subcommittee noted that some 36.5 million observations of asteroids and comets had been collected in 2022 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 31,366 as at 5 February 2023, of which a record number of 3,190 had been discovered in 2022, and that currently a total of 2,328 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 42 per cent of the near-Earth objects in that size range had been found.

19. The Subcommittee noted that there were many national and international 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.

20. The Subcommittee noted the first-ever successful demonstration of the kinetic impact deflection technique, which was carried out by NASA on 26 September 2022. The NASA DART mission was the first planetary defence technology demonstration mission that altered the motion of a natural celestial body. In that regard, the Subcommittee noted that that mission involved international collaboration, including the contribution made by the Italian Space Agency (ASI) through its LICIACube. It also noted that experts from around the world were participating in evaluating the mission’s results using Earth-based telescopes. The Subcommittee further noted that, as a follow-up, the Hera mission of ESA had been planned. The aim of the mission was to encounter the Didymos asteroid system in 2026, with a view to providing a valuable assessment of the deflection technique test of the DART mission.

21. The Subcommittee noted that the IAWN steering committee was generally holding review meetings twice a year, most recently on 7 February 2023, in conjunction with the sixtieth session of the Subcommittee. There were currently 50 signatories to the IAWN Statement of Intent, representing independent astronomers, observatories and space institutions from over 20 countries.

22. The Subcommittee noted that the signatories to the IAWN Statement of Intent recognized the importance of collaborative data analysis and of being adequately prepared for communications with a variety of audiences about near-Earth objects,

their close approaches to the Earth and Earth impact risks. It was further noted that more information was available on the IAWN website, hosted by the University of Maryland (United States), at http://iawn.net.

23. The Subcommittee noted that, in 2022, the IAWN had conducted a coordinated campaign to observe a well-known near-Earth asteroid, 2005 LW3, which served as a second evaluation of the technical capabilities of the worldwide observing network. A record 82 observatories around the world participated.

24. The Subcommittee also noted that the worldwide astronomical community continued to observe the Didymos system in the weeks that followed the world's first attempt to change the motion of a body in space. In that regard, the Subcommittee noted the important role of the IAWN signatories that participated in conducting the critical measurements, helping to confirm the kinetic impactor as a tested, viable option for asteroid threat mitigation.

25. The Subcommittee 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.

26. The Subcommittee noted that, since the previous session of the Subcommittee, SMPAG had held two meetings: its nineteenth meeting, on 19 and 20 October 2022, and its twentieth meeting, on 8 and 9 February 2023, chaired by ESA as the re-elected Chair for the period 2023–2025, 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).

27. The Subcommittee noted that SMPAG currently had 18 members and 7 permanent observers. It took note of the indication of interest expressed by space agencies from Canada, India and Kenya to join SMPAG. In that regard, the Subcommittee noted that States and their space agencies and offices 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.

28. The Subcommittee noted that SMPAG, at the meetings held since the previous session of the Subcommittee, had exchanged information on the ongoing and planned activities of its members related to planetary defence, from both a technical and policy standpoint. It also noted that SMPAG had been briefed, inter alia, on ongoing sample return missions, namely the Hayabusa2 extended mission and OSIRIS-REx, and on the DART and Hera planetary defence-related missions.

29. The Subcommittee noted the progress made in the first hypothetical impact threat exercise of SMPAG, which was launched in 2021, under the lead of the Italian Space Agency and the Polytechnic University of Milan. The primary objective of the 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. In that regard, the Subcommittee noted that the first phase of the exercise, which focused on national procedures, had been completed, and that the second phase would concentrate on the coordination of tasks among SMPAG members.

30. The Subcommittee recalled 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.

31. The Subcommittee noted that the eighth International Academy of Astronautics Planetary Defense Conference would be held from 2 to 7 April 2023 in Vienna, at the Austrian Academy of Sciences and at the Vienna International Centre. The conference

was being hosted by the Office for Outer Space Affairs, in cooperation with ESA and the Commission of Geosciences of the Austrian Academy of Sciences.

32. The Subcommittee noted that the next meetings of the IAWN steering committee and of SMPAG were planned for 7 October 2023 and 8 and 9 October 2023, respectively, and were to be held in the United States.

XII. Space and global health

33. In accordance with General Assembly resolution 77/121, the Subcommittee considered agenda item 14, entitled "Space and global health".

34. The representatives of Canada, China, India, Indonesia, Japan, Mexico, Switzerland, the United Kingdom and the United States made statements under agenda item 14. The observer for the Space and Global Health Network also made a statement under the item. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

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

(a) "Australian outlook on cybersecurity initiatives for sustainable digital health", by the representative of Australia;

(b) "The Health Beyond Initiative", by the representative of Canada;

(c) "Health-related applications of remote sensing and geographic information systems in the Philippines", by the representative of the Philippines;

(d) "Through ground-based international experiments to deep space *per aspera ad astra*", by the representative of the Russian Federation.

36. The Subcommittee had before it a conference room paper containing a status report of the Space and Global Health Network (A/AC.105/C.1/2023/CRP.29).

37. The Subcommittee welcomed the adoption of General Assembly resolution 77/120, entitled "Space and global health", in which the Assembly provided recommendations on strengthening collaboration between the space and global health sectors as an efficient strategy for making better use of space science and technology for access to global health. The Subcommittee also welcomed the adoption of resolution 77/121, in which the Assembly noted with satisfaction the establishment of the Space and Global Health Platform and welcomed the establishment of the Space and Global Health Network.

38. The Subcommittee recalled that it had been agreed that the Space and Global Health Network – established in 2022 as a result of the recommendations made by the Working Group on Space and Global Health, which were endorsed by the Committee on the Peaceful Uses of Outer Space at its sixty-fifth session (A/77/20, para. 168) – should provide annual reports to the Subcommittee through its coordinator, and agreed to invite the Network to participate as an observer in the sessions of the Committee and its subcommittees.

39. The Subcommittee noted that the Space and Global Health Network and the Space and Global Health Platform had been presented at the "UN-Space" session of the United Nations/Austria World Space Forum 2022 on the theme "Sustainability in space for sustainability on Earth", which had been held from 13 to 15 December 2022. Participants in the Forum had noted with satisfaction that the UN-Space session was the first concrete step in the implementation of the space and global health measures in General Assembly resolutions 77/120 and 77/121, and they encouraged greater participation of the health and space community in the work of the Network with the objective of increasing the use and application of space science and technology in the global health domain as a means of promoting equitable, affordable and universal access to health for all.

40. The Subcommittee heard status reports by the coordinator of the Space and Global Health Network and noted that two meetings of the Network had been held on 8 and 10 February 2023 in hybrid format on the margins of the sixtieth session of the Subcommittee, at which participants agreed on a revised version of the statement of intent for participation in the Network (A/AC.105/C.1/2023/CRP.29, annex). The Subcommittee expressed its appreciation to the Office for Outer Space Affairs for facilitating the work of the Network within existing resources.

41. The Subcommittee noted that side events would be organized by the Space and Global Health Network on the margins of the seventy-sixth World Health Assembly, to be held in Geneva from 21 to 30 May 2023, as well as on the margins of the sixty-sixth session of the Committee on the Peaceful Uses of Outer Space, to be held in Vienna from 31 May to 9 June 2023.

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

43. 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.

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

45. The view was expressed that it was necessary to strengthen research on the use of space observation in order to better understand the emissions, trends and impacts on human health of air pollutants such as particulate matter ($PM_{2.5}$ and PM_{10}) and ozone.