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

V. Space debris

1. In accordance with General Assembly resolution 62/217, the Scientific and Technical Subcommittee continued its consideration of agenda item 8, "Space debris".

2. The representatives of Brazil, Canada, China, Cuba, the Czech Republic, Germany, Greece, India, Indonesia, Italy, Japan, the Russian Federation, the United States of America and Venezuela (Bolivarian Republic of) made statements on the item.

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

(a) "Space debris outlook: 'USA 193'", by the representative of the United States;

(b) "United Nations Space Debris Mitigation Guidelines—German National Implementation Mechanism", by the representative of Germany;

(c) "A summary of the second geostationary end-of-life workshop", by the representative of France;

(d) "Global Space Exploration Strategy", by the representative of Italy;

(e) "Space debris mitigation activities in Japan", by the representative of Japan;

(f) "United States space debris environment and policy update", by the representative of the United States;

(g) "Analysis of possibilities of the application of the effect of dispersion for space debris tracking", by the representative of Ukraine;

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(h) “International Scientific Optical Observation Network (ISON) for near-Earth space surveillance: results of the first years of work and plans for the future”, by the representative of the Russian Federation;

(i) “IADC guidelines update”, by the representative of the Russian Federation;

(j) “Russian activities on the space debris problem”, by the representative of the Russian Federation;

(k) “Space debris mitigation activities at ESA”, by the representative of ESA.

4. The Subcommittee had before it the note by the Secretariat on national research on space debris, safety of space objects with nuclear power sources on board and problems relating to their collision with space debris (A/AC.105/918 and Add.1), containing replies received from Member States on the issue.

5. The Subcommittee noted with great satisfaction that in paragraph 26 of its resolution 62/217, the General Assembly had endorsed the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space.

6. The Subcommittee agreed that the implementation of voluntary guidelines for the mitigation of space debris at the national level would increase mutual understanding on acceptable activities in space, thus enhancing stability in space and decreasing the likelihood of friction and conflict.

7. The Subcommittee noted that it should periodically consult the Inter-Agency Space Debris Coordination Committee (IADC) regarding future revisions of the IADC Space Debris Mitigation Guidelines in the light of evolving technologies and debris mitigation practices and noted that the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space might be amended in accordance with such revisions.

8. The Subcommittee agreed that Member States, in particular space-faring countries, should pay greater attention to the problem of collisions of space objects, including those with nuclear power sources (NPS) on board, with space debris and to other aspects of space debris, including its re-entry into the atmosphere. It noted that the General Assembly, in its resolution 62/217, had called for the continuation of national research on that question, for the development of improved technology for the monitoring of space debris and for the compilation and dissemination of data on space debris and had agreed that international cooperation was needed to expand appropriate and affordable strategies to minimize the impact of space debris on future space missions. The Subcommittee agreed that research on space debris should continue and that Member States should make available to all interested parties the results of that research, including information on practices that had proved effective in minimizing the creation of space debris.

9. The Subcommittee noted that some States were implementing space debris mitigation measures consistent with the Space Debris Mitigation Guidelines of the Committee and/or the IADC Guidelines or had developed their own space debris mitigation standards based on those guidelines. The Subcommittee also noted that other States were using the IADC Guidelines, as well as the European code of

conduct for space debris mitigation, as a reference in the regulatory framework established for national space activities.

10. The Subcommittee noted with appreciation that States had adopted a number of approaches and concrete actions covering various aspects of space debris mitigation, such as the reorbiting of satellites, passivation, end-of-life operations and the development of specific software and models for space debris mitigation. The Subcommittee also noted that research was being conducted in the areas of technology for space debris observation, space debris environmental modelling and technologies to protect space systems from space debris and to limit a new generation of space debris.

11. The Subcommittee agreed that Member States and space agencies should once again be invited to provide reports on research on space debris, the safety of space objects with NPS on board and problems relating to the collision of such space objects with space debris.

12. Some delegations expressed the view that the Scientific and Technical Subcommittee should also investigate active debris removal operations, which would be particularly important for the more intensively used altitudes of the low-Earth orbit.

13. Some delegations expressed the view that a non-legally binding set of guidelines was not sufficient and that consideration should be given to bringing the issue of space debris before the Legal Subcommittee in order to develop a legally binding instrument.

14. Other delegations expressed the view that legally binding space debris mitigation measures were not necessary because the desired outcome was the acknowledgement by the broadest number of States that space debris could and should be controlled, to the benefit of all.

15. The view was expressed that the States largely responsible for the creation of space debris and the States having the capability to take action on space debris mitigation should make a greater contribution to space debris mitigation efforts than other States.

16. The view was expressed that open access to data and information on the re-entry of space debris was important for disaster mitigation.

17. Some delegations expressed the view that the cooperative approach to solving emerging problems could productively serve in the future as a model for the development of other rules or guidelines addressing the need for safety of space traffic. Those delegations thus supported including on the agenda an item on the long-term sustainability of space activities.

VI. Near-Earth objects

18. In accordance with General Assembly resolution 62/217, the Scientific and Technical Subcommittee considered agenda item 12, “Near-Earth objects”, under the multi-year workplan adopted by the Subcommittee at its forty-fourth session (A/AC.105/890, annex III). Pursuant to the workplan, in 2007, international

organizations, regional bodies and others active in the field of near-Earth object research were invited to report to the Subcommittee on their activities.

19. The representatives of Canada, the Czech Republic, Japan and the United States made statements on the item.

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

(a) "Update of work on a draft NEO protocol", by the observer for ASE;

(b) "Asteroid finder: a German small satellite mission", by the representative of Germany;

(c) "Asteroid-comet hazard problem: activities in Russia", by the representative of the Russian Federation;

(d) "International campaign for the improvement of the Apophis ephemeris", by the representative of France;

(e) "NEOs – a youth perspective", by the observer for SGAC.

21. The Subcommittee also heard a presentation on the activities carried out at the 2007 Planetary Defense Conference, by the observer for the Aerospace Corporation, upon the invitation of the Chairman of the Working Group on Near-Earth Objects.

22. The Subcommittee had before it the following documents:

(a) Note by the Secretariat on information on research in the field of near-Earth objects carried out by Member States, international organizations and other entities (A/AC.105/896);

(b) Interim report of the Action Team on Near-Earth Objects (2007-2008) (A/AC.105/C.1/L.295).

23. The Subcommittee noted that near-Earth objects were asteroids and comets with orbits that could cross the orbit of the planet Earth. The Subcommittee also noted that the interest in asteroids was largely due to their scientific value as remnant debris from the inner solar system formation process, the possibility of their collision with the Earth and its devastating consequences, and the availability of various natural resources on them.

24. The Subcommittee noted that early detection and precision tracking were the most effective tools for the management of threats posed by near-Earth objects. In that regard, the Subcommittee noted with satisfaction that a number of international teams, active in various countries, were searching, investigating and cataloguing near-Earth objects.

25. The Subcommittee noted with satisfaction that a number of institutions were investigating possibilities for the mitigation of threats posed by near-Earth objects. The Subcommittee also noted that any measures to mitigate such threats would require coordinated international efforts as well as an increased knowledge base of the properties of near-Earth objects.

26. The Subcommittee noted that some member States had implemented or were planning to implement fly-by and exploration missions to near-Earth objects. The Subcommittee also noted past and upcoming missions investigating near-Earth

objects, such as the Hayabusa spacecraft operated by Japan, the Near Earth Object Surveillance Satellite (NEOSSat) of the United States and Canada and the Marco Polo Near-Earth Object Sample Return Mission of ESA and the Japan Aerospace Exploration Agency.

27. The Subcommittee noted the significant progress achieved by the United States in reaching its target of detecting 90 per cent of all near-Earth objects greater than one kilometre in diameter. The Subcommittee noted that the United States had determined that only 136 near-Earth objects with a diameter greater than one kilometre could pose a collision hazard with the Earth and that the United States was seeking to achieve, by 2020, its target of detecting, tracking, cataloguing and characterizing 90 per cent of objects with a diameter greater than 140 metres.

28. The Subcommittee agreed that efforts to detect and track near-Earth objects should be continued and expanded at the national and international levels.

29. Pursuant to paragraph 15 of General Assembly resolution 62/217, the Subcommittee, at its 688th meeting, on 18 February, reconvened the Working Group on Near-Earth Objects under the chairmanship of Richard Crowther (United Kingdom). The Working Group on Near-Earth Objects held […] meetings.

30. At its […]th meeting, on […] February, the Subcommittee endorsed the report of the Working Group on Near-Earth Objects (see annex […]), including the amended multi-year workplan proposed by the Working Group for the period 2009-2011.

VIII. Use of Nuclear power sources in outer space

31. In accordance with General Assembly resolution 62/217, the Scientific and Technical Subcommittee continued its consideration of agenda item 11, “Use of nuclear power sources in outer space”, under the multi-year workplan for the period 2007-2010, adopted at its forty-fourth session (A/AC.105/890, paras. 112-113 and annex II).

32. The representatives of Cuba, Nigeria, South Africa, the Russian Federation, the United States and Venezuela (Bolivarian Republic of) made statements under the agenda item.

33. The Subcommittee noted with satisfaction the progress made by the Joint Expert Group of the Scientific and Technical Subcommittee and the International Atomic Energy Agency (IAEA), established at the forty-fourth session of the Subcommittee, in the development of an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable nuclear power source (NPS) applications in outer space.

34. At the 683rd meeting, on 13 February, the Chairman of the Joint Expert Group, Sam A. Harbison (United Kingdom), made a statement, informing the Subcommittee of the work that had been done and was to be carried out by the Joint Expert Group under the multi-year workplan.

35. The view was expressed that the progress achieved by the Joint Expert Group demonstrated the value of combining the expertise of the Subcommittee in the use of NPS in outer space with that of IAEA in designing a nuclear safety framework.

36. The view was expressed that the Joint Expert Group should not be composed solely of experts from the countries that had traditionally dealt with the topic of the use of nuclear power sources in outer space.

37. The view was expressed that, while the development of the safety framework to regulate the use of NPS in outer space was welcome, it needed to be defined in greater detail. That delegation requested the Joint Expert Group to define more precisely the standards and parameters that would apply to the use of NPS in outer space.

38. Some delegations were of the view that it would be necessary to develop a binding instrument on the basis of the safety framework in order to prevent irresponsible and indiscriminate use of NPS in outer space.

39. The view was expressed that the safety framework would supplement the Principles Relevant to the Use of Nuclear Power Sources in Outer Space (General Assembly resolution 47/68) regarding the design, development and use of NPS in outer space and would increase the responsibility of Governments and intergovernmental organizations to comply with safety requirements related to the use of NPS in outer space.

40. Some delegations were of the view that, until the safety framework had been clearly defined and progress had been made towards more specific commitments in terms of the use of NPS in outer space, their use should be as limited as possible. In addition to that limited use, comprehensive and transparent information setting out the measures taken to ensure safety should be provided for other countries. Those delegations were of the view that no justification existed for contemplating the use of NPS in near-Earth orbits, where the risks were much greater than in the outer orbits and for which other sources of energy were available that were much safer and that had been proven to be efficient.

41. The view was expressed that the application of NPS to space missions was important because it could help nations solve the challenges and further the objectives of space exploration.

42. Some delegations were of the view that, given that space systems were subject to ever-increasing demands in terms of performance and capability, nuclear power would in many cases be the only energy source capable of meeting certain mission requirements.

43. The view was expressed that the use of fission reactors in outer space constituted a great risk for humankind and that the use of NPS in space should not be permitted unless the potential consequences for human beings and the environment had first been assessed.

44. Some delegations were of the view that the possibility of spacecraft equipped with nuclear reactors being damaged as a result of collisions with orbital debris was cause for concern, as the Earth's orbital environment could become contaminated with radioactive debris, which could be a threat to the Earth's biosphere.

45. The view was expressed that, while the use of NPS significantly enhanced space capabilities for power-intensive applications, it was important to prevent outer space from becoming a theatre of military conflict.

46. The Subcommittee noted the continuation by Member States of the NPS-based space missions Cassini-Huygens and New Horizons and the Opportunity and Spirit Mars rovers, and the plans to use NPS on the next generation rover on Mars in 2009.

47. Pursuant to General Assembly resolution 62/217, the Subcommittee, at its 683rd meeting, on 13 February, reconvened its Working Group on the Use of Nuclear Power Sources in Outer Space under the chairmanship of Sam A. Harbison (United Kingdom). The Working Group held six meetings.

48. The Subcommittee noted that, at its current session, the Working Group had considered the draft safety framework that had been prepared by the Joint Expert Group and that was contained in document A/AC.105/C.1/L.292, and that the updated text of the draft safety framework, prepared on the basis of comments received from member States and revisions made by the Joint Expert Group, would be made available by the Secretariat as a revised version of document A/AC.105/C.1/L.292 (to be issued subsequently as document A/AC.105/C.1/L.292/Rev.1) for further comments by member States and permanent observers of the Committee shortly after the conclusion of the forty-fifth session of the Subcommittee.

49. At its 695th meeting, on 21 February, the Subcommittee endorsed the report of the Working Group (see annex II to the present report).

IX. Recent developments in global navigation satellite systems

50. In accordance with General Assembly resolution 62/217, the Scientific and Technical Subcommittee considered agenda item 10, “Recent developments in global navigation satellite systems”, as a new regular item, and reviewed issues 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.

51. The representatives of Canada, China, India, Indonesia, Italy, Japan, Malaysia, Nigeria, the Russian Federation and the United States made statements under the agenda item. The observer for the European Commission also made a statement.

52. The Subcommittee heard the following scientific and technical presentation on the item: “update on the Indian Satellite Navigation Programme”, by the representative of India.

53. Pursuant to General Assembly resolution 62/217, the Chairman of ICG made a statement on its current and future activities.

54. The Subcommittee also heard a presentation by the representative of the Office for Outer Space Affairs, which served as the executive secretariat of ICG and the Providers Forum. The Subcommittee commended the Office on the support that it continued to provide in its role as the executive secretariat.

55. The Subcommittee noted with appreciation the contributions of the United States, totalling 1 million United States dollars, to the Office for Outer Space Affairs, in support of GNSS related activities, including regional workshops and ICG and the Providers Forum.

56. The Subcommittee noted with appreciation that ICG had been established, on a voluntary basis, as an informal body to promote cooperation, as appropriate, on matters of mutual interest to its members related to civil satellite-based positioning, navigation, timing and value-added services, as well as cooperation on the compatibility and interoperability of GNSS, and to promote the use of GNSS to support sustainable development, particularly in developing countries. The Subcommittee also noted with appreciation that the establishment of ICG had been a concrete result of the implementation of the recommendations of UNISPACE III.

57. The Subcommittee noted with satisfaction that ICG had held its first meeting in Vienna, on 1 and 2 November 2006 (A/AC.105/879) and its second meeting in Bangalore, India, from 4 to 7 September 2007 (A/AC.105/901). The Subcommittee also noted that the third meeting of ICG would be held in Pasadena, United States, from 8 to 12 December 2008 and that the fourth meeting would be held in the Russian Federation in 2009.

58. The Subcommittee noted that the Providers Forum, which had been established to enhance the compatibility and interoperability of current and future global and regional navigation satellite systems, and which currently included China, India, Japan, the Russian Federation and the United States, as well as the European Community, had held its first meeting in Bangalore, India, on 4 September 2007.

59. The Subcommittee noted that the membership structure of ICG included members, associate members and observers, and that currently 9 States, the European Community and 15 organizations (United Nations entities and intergovernmental and non-governmental organizations) were members of ICG. The Subcommittee further noted that participation in ICG was open to all States and entities that were providers or users of GNSS services and that were interested and willing to actively engage in ICG activities.

60. The Subcommittee agreed on the importance of international cooperation on matters related to the compatibility and interoperability of global and regional space-based positioning, navigation and timing systems, and on the importance of promoting the use of GNSS for the benefit of all people worldwide, as space-based positioning, navigation and timing services were of vital importance to the world's economies and societies.

61. The Subcommittee also noted that an ICG information portal had been established to provide full information on all activities of ICG and the Providers Forum (http://www.unoosa.org/oosa/en/SAP/gnss/icg.html).

62. The Subcommittee noted that the Global Positioning System (GPS), operated by the United States, was a dual civil-military system consisting of 30 operational satellites and had reached its full operational capability in 1993. The Subcommittee also noted that the United States had been committed to constantly improving the accuracy and availability of GPS signals.

63. The Subcommittee noted that the Global Navigation Satellite System (GLONASS), operated by the Russian Federation, was a dual civil-military system and had been operational since 1993. The Subcommittee also noted that in 2001 the Russian Federation had approved the further development of the Federal GLONASS

Programme and that GLONASS would achieve uninterrupted global coverage by the end of 2009.

64. The Subcommittee noted that the Compass satellite navigation system, operated by China, comprised 5 GEO satellites and 30 non-GEO satellites and was to be a global navigation satellite system. To date, China had successfully launched four satellites.

65. The Subcommittee also noted that European countries were developing two GNSS programmes: a global navigation satellite system, Galileo; and a regional navigation satellite system, the European Geostationary Navigation Overlay Service (EGNOS). Galileo, jointly operated by the European Community and ESA, was planned to become fully operational in 2013.

66. The Subcommittee noted that Japan was promoting the Quasi-Zenith Satellite System (QZSS) and the Multi-functional Transport Satellite (MTSAT) Satellite-based Augmentation System (MSAS), both of which were augmentation systems of GPS. QZSS, which consists of satellites with highly inclined geosynchronous orbits, can transmit signals free from obstruction in urban and mountainous areas and, when used together with GPS, improves availability, enlarges the area of GPS usage and assures more accurate positioning information.

67. The Subcommittee noted that the GPS and GEO-Augmented Navigation (GAGAN) was being implemented in India and that the country was initiating an indigenously built regional system, the Indian Regional Navigation Satellite System (IRNSS), which would be capable of providing optimal position accuracy using stand-alone GPS and would comprise seven satellites: three in geostationary orbit and four satellites in a geosynchronous orbit.

68. The Subcommittee noted that the first communication satellite of Nigeria, Nigcomsat-1, launched in May 2007, carried a satellite-based augmentation system, which was implemented by the National Space Research and Development Agency (NASDRA) of Nigeria, thus enabling the African continent to benefit from GNSS applications.

69. The Subcommittee noted that a seminar on GNSS policy had been held in Malaysia in July 2007, with the objective of identifying important policy issues in GNSS to be incorporated in the national space policy of Malaysia.

70. The Subcommittee also noted that progress had been made with respect to COSPAS-SARSAT, which had celebrated its twenty-fifth anniversary in 2007. The Subcommittee noted that Canada, together with several international partners, continued efforts to improve the system by developing and testing the next generation of COSPAS-SARSAT, known as the Medium Earth Orbit Search and Rescue (MEOSAR) system. The system would utilize search and rescue (SAR) payloads on future global navigation satellites in medium-Earth orbit, such as GPS, GLONASS and Galileo, to improve coverage and the speed of detecting and locating 406 megahertz emergency distress beacons worldwide.

71. The Subcommittee noted that, as new space-based positioning, navigation and timing systems were emerging, it was crucial, for the benefit of all, that they be compatible and interoperable.