



General Assembly

Distr.: Limited
14 February 2013

Original: English

**Committee on the Peaceful
Uses of Outer Space
Scientific and Technical Subcommittee
Fiftieth session
Vienna, 11-22 February 2013**

Draft report

[...]. Introduction

1. The Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space held its fiftieth session at the United Nations Office at Vienna from 11 to 22 February 2013, under the chairmanship of Félix Clementino Menicocci (Argentina).
2. The Subcommittee held [20] meetings.

A. Attendance

3. Representatives of the following [57] member States of the Committee attended the session: Algeria, Argentina, Armenia, Australia, Austria, Belgium, Brazil, Burkina Faso, Canada, Chile, China, Costa Rica, Cuba, Czech Republic, Ecuador, Egypt, France, Germany, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Italy, Japan, Jordan, Kazakhstan, Kenya, Lebanon, Libya, Malaysia, Mexico, Mongolia, Netherlands, Nigeria, Pakistan, Peru, Philippines, Poland, Portugal, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Slovakia, South Africa, Spain, Sweden, Switzerland, Tunisia, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay, Venezuela (Bolivarian Republic of) and Viet Nam.
4. At its 777th meeting, on 11 February, the Subcommittee decided to invite, at their request, observers for the Dominican Republic, El Salvador, Ghana, Guatemala, Israel and the United Arab Emirates to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.



5. At the same meeting, the Subcommittee decided to invite, at its request, the observer for the Sovereign Military Order of Malta to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.
6. Also at that same meeting, the Subcommittee decided to invite, at its request, the observer for the European Union to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.
7. Observers for the Economic and Social Commission for Western Asia (ESCWA), the United Nations Institute for Disarmament Research (UNIDIR), the International Telecommunication Union (ITU) and the World Meteorological Organization (WMO) attended the session. The session was also attended by the observer for the International Organization for Standardization (ISO).
8. The session was attended by observers for the following intergovernmental organizations with permanent observer status with the Committee: Asia-Pacific Space Cooperation Organization (APSCO), Association of Remote Sensing Centres in the Arab World (ARSCAW), European Organisation for Astronomical Research in the Southern Hemisphere (ESO), European Space Agency (ESA), European Telecommunications Satellite Organization (EUTELSAT-IGO) and Regional Centre for Remote Sensing of North African States (CRTEAN).
9. The session was also attended by observers for the following non-governmental organizations (NGOs) having permanent observer status with the Committee: Association of Space Explorers (ASE), EURISY, European Space Policy Institute (ESPI), International Academy of Astronautics (IAA), International Association for the Advancement of Space Safety (IAASS), International Astronautical Federation (IAF), International Astronomical Union (IAU), International Society for Photogrammetry and Remote Sensing (ISPRS), International Space University (ISU), 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) and World Space Week Association (WSWA).
10. The Subcommittee took note of the application of Ghana for membership in the Committee (A/AC.105/C.1/2013/CRP.3).
11. The Subcommittee also took note of the application by the Inter-Islamic Network on Space Sciences and Technology (ISNET) for permanent observer status with the Committee (A/AC.105/C.1/2013/CRP.21).
12. A list of the representatives of States, United Nations entities and other international organizations attending the session is contained in A/AC.105/C.1/2013/INF/[...].

B. Adoption of the agenda

13. At its 777th meeting, on 11 February, 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. Implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III).
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. Use of nuclear power sources in outer space.
12. Near-Earth objects.
13. Long-term sustainability of outer space activities.
14. 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.
15. Draft provisional agenda for the fifty-first session of the Scientific and Technical Subcommittee.
16. Report to the Committee on the Peaceful Uses of Outer Space.

C. General statements

14. Statements were made by representatives of the following member States during the general exchange of views: Algeria, Argentina, Austria, Brazil, Canada, China, Cuba, Czech Republic, Ecuador, France, Germany, Hungary, India, Indonesia, Iran (Islamic Republic of), Italy, Japan, Libya, Malaysia, Nigeria, Pakistan, Philippines, Poland, Republic of Korea, Romania, Russian Federation, Saudi Arabia, South Africa, Switzerland, Ukraine, United States, Venezuela (Bolivarian Republic of) and Viet Nam. A statement was also made by the

representative of Guatemala on behalf of the Group of Latin American and Caribbean States. The observers for ESCWA and WMO made general statements. General statements were also made by the observers for APSCO, ESA, ESPI, EURISY, IAF, IAU, NSS, SGAC and SWF.

15. The Subcommittee welcomed Armenia, Costa Rica and Jordan as new members of the Committee on the Peaceful Uses of Outer Space. The Ibero-American Institute of Aeronautic and Space Law and Commercial Aviation and SCOSTEP were welcomed as the newest permanent observers of the Committee.

16. At the 777th meeting, the Chair made a statement outlining the work of the Subcommittee at its current session. The Chair emphasized the need to study carefully the outcome of the United Nations Conference on Sustainable Development, held in Rio de Janeiro, Brazil, from 20 to 22 June 2012, and the emerging post-2015 development agenda in order for the Subcommittee to assist the Committee in its consideration of those global processes.

17. Also at the 777th meeting, the Director of the Office for Outer Space Affairs of the Secretariat made a statement reviewing the work programme of the Office and the need for additional resources to be able to successfully perform the envisaged responsibilities for the biennium 2014-2015.

18. The Subcommittee expressed its gratitude to Mazlan Othman, Director of the Office for Outer Space Affairs, on the occasion of her retirement, for her dedication to the work of the Office and to the Committee, noting her contribution to the advancement of space science and technology.

19. Some delegations reiterated the commitment of their countries to the peaceful use and exploration of outer space and emphasized the following principles: equal and non-discriminatory access to outer space and equal conditions for all States, irrespective of their level of scientific, technical and economic development; non-appropriation of outer space, including the Moon and other celestial bodies, by claim of sovereignty, use, occupation or any other means; non-militarization of outer space and its strict use for the improvement of living conditions and peace on the planet; and regional cooperation to promote the development of space activities.

20. Some delegations expressed the view that, given the impact of space activities on human life and the environment, there should be greater coordination and interaction between the Scientific and Technical Subcommittee and the Legal Subcommittee in order to promote the establishment of binding international norms addressing issues such as space debris and use of nuclear power sources in outer space, which were critical issues in the use and exploration of outer space.

21. Some delegations expressed the view that developing countries should benefit from space technologies, in particular to support their social and economic development, that it was necessary to promote cooperation to facilitate data exchange and the transfer of technology among States and that training of scientists in developing countries was crucial for the free flow of scientific information and data exchange, increased capacity-building and knowledge-sharing.

22. The Subcommittee heard the following scientific and technical presentations:
- (a) “Asia-Pacific Regional Space Agency Forum: 20 years of history and a regional cooperation framework — towards a new era”, by the representative of Japan;
 - (b) “Mars Science Laboratory Mission and Curiosity”, by the representative of the United States;
 - (c) “Naro (KSLV-1): the first Korean space launch vehicle”, by the representative of the Republic of Korea;
 - (d) “Canada’s 50 years in space: Canadian space milestones”, by the representative of Canada;
 - (e) “Mexico’s participation in the Japanese Experiment Module–Extreme Universe Space Observatory (JEM-EUSO) mission”, by the representative of Mexico;
 - (f) “The Laser Relativity Satellite (LARES) mission: an example of a low-cost, high-science mission”, by the representative of Italy;
 - (g) “Aerospace Science and Technology Department: contributions towards the Brazilian space programme”, by the representative of Brazil;
 - (h) “The Polish contribution to the Copernicus programme”, by the representative of Poland;
 - (i) “The Pioneer mission of the Kavoshgar”, by the representative of the Islamic Republic of Iran;
 - (j) “Activities of the Ecuadorian Space Institute”, by the representative of Ecuador;
 - (k) “BRITE constellation: launch of the first Austrian nanosatellites”, by the representative of Austria;
 - (l) “Fifth PSIPW award winners and latest activities”, by the observer for PSIPW;
 - (m) “Space Generation Congress 2012: perspectives from university students and young professionals in the space sector”, by the observer for SGAC.

23. The Subcommittee noted with appreciation the lunchtime presentation by Noah Warner of the NASA Jet Propulsion Laboratory and the video entitled “Curiosity on Mars”.

24. The Subcommittee expressed its gratitude to the delegation of Japan for organizing a scientific and technical event on the margins of the current session of the Subcommittee.

D. National reports

25. The Subcommittee took note with appreciation of the reports submitted by Member States (see A/AC.105/1025 and Add.1, A/AC.105/C.1/2013/CRP.7, A/AC.105/C.1/2013/CRP.8, A/AC.105/C.1/2013/CRP.9 and A/AC.105/C.1/2013/CRP.22)

for its consideration under agenda item 3, “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

26. On 11 February, IAF organized a symposium on the theme “Overview of studies and concepts for active orbital debris removal”, which was moderated by Gerard Brachet of IAF, with a welcome statement made by Kiyoshi Higuchi, President of IAF. The presentations given at the symposium included the following: “United States active debris removal efforts”, by Daren McKnight of Integrity Applications Incorporated; “Active debris removal activities in Centre national d’études spatiales (CNES)”, by Christophe Bonnal of CNES; “Space debris-related activities: the Japanese case”, by Tetsuo Yasaka of Kyushu University; “International Science and Technology Centre (ISTC) activities on the space debris problem”, by Tatiana Ryshova of ISTC; “The German Orbital Servicing Mission (DEOS)”, by Alin Albu-Schaeffer of the German Aerospace Center; “Status of active debris removal developments at the Swiss Space Center”, by Thomas Shildknecht of the Swiss Space Center; “The ESA Clean Space initiative”, by Leopold Summerer of ESA; and “The non-technical challenges of active debris removal”, by Brian Weeden of SWF.

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

27. After considering the items before it, the Subcommittee, at its [...] meeting, on [...] February 2013, 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.

[...]. Space Debris

28. In accordance with General Assembly resolution 67/113, the Subcommittee considered agenda item 7, “Space debris”.

29. The representatives of Canada, China, the Czech Republic, France, Germany, India, Indonesia, Italy, Japan, the Republic of Korea and the United States made statements under agenda item 7. A statement was made under the item by the representative of Chile on behalf of the Group of Latin American and Caribbean States. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

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

- (a) “CNES space debris activities”, by the representative of France;

- (b) “Results of geostationary orbit and high elliptical orbit monitoring by the International Scientific Optical Network in 2012”, by the representative of the Russian Federation;
- (c) “Space debris mitigation”, by the representative of Ukraine;
- (d) “The Phoenix project”, by the representative of the United States;
- (e) “United States space debris environment and operational updates”, by the representative of the United States;
- (f) “ESA debris mitigation activities in 2012”, by the observer for ESA;
- (g) “Evolution of the future low-Earth orbit debris environment”, by the observer for ESA, in his capacity as the chair of Inter-Agency Space Debris Coordination Committee (IADC);
- (h) “Preserving the space environment collaboratively”, by the observer for IAASS.

31. 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, containing replies received from Member States and international organizations on the issue (A/AC.105/C.1/107, A/AC.105/C.1/2013/CRP.4 and A/AC.105/C.1/2013/CRP.19).

32. The Subcommittee noted with appreciation the usefulness of the IAF symposium on studies and concepts for active orbital debris removal in describing the complexities of dealing with the issue and the urgency of finding an immediate solution to mitigate debris.

33. The Subcommittee expressed concern over the increasing amount of space debris and encouraged those States which had not yet done so to consider voluntary implementation of the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space.

34. The Subcommittee noted with satisfaction that some States were implementing space debris mitigation measures consistent with the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space and/or the IADC Space Debris Mitigation Guidelines, and that other States had developed their own space debris mitigation standards based on those guidelines.

35. The Subcommittee noted that other States were using the IADC Guidelines and the European Code of Conduct for Space Debris Mitigation as reference points in their regulatory frameworks for national space activities. The Subcommittee further noted that other States had cooperated, in the framework of the ESA space situational awareness programme, to address the issue of space debris.

36. The Subcommittee noted with appreciation that States had adopted a number of approaches and concrete actions to mitigate space debris, including the improvement of the design of launch vehicles and spacecraft, the reorbiting of satellites, passivation, end-of-life operations and the development of specific software and models for space debris mitigation.

37. The Subcommittee noted that research was being conducted in the areas of technology for space debris observation and continuous monitoring, space debris

re-entry prediction, collision avoidance and collision probability modelling, in-orbit robotic servicing of satellites, and technologies to protect space systems from space debris and to limit the creation of additional space debris.

38. Some delegations expressed the view that increased space debris mitigation measures at the national level and enhanced regional and international cooperation in that field were necessary for assuring safe and secure access to space for all nations, the protection of space assets and the sustainable development of outer space.

39. Some delegations expressed the view that the Scientific and Technical Subcommittee and the Legal Subcommittee should cooperate with the aim of finding a comprehensive solution for space debris mitigation.

40. The view was expressed that, since the future of space exploration largely depended on the effectiveness of space debris mitigation measures, mitigation of space debris and the limitation of its creation should be among the priorities of the work of the Subcommittees.

41. The view was expressed that the Space Debris Mitigation Guidelines of the Committee should be reviewed in view of the increase in the number of operating agencies, launches and missions, and the involvement of private sector.

42. The view was expressed that the Subcommittee should consult IADC periodically to stay abreast of future revisions to the IADC Guidelines and evolving technologies and debris mitigation practices.

43. The view was expressed that it was important for information to be swiftly circulated among members of the Subcommittee and IADC on the work and activities undertaken in the field of space debris.

44. Some delegations were of the view that exchange of knowledge base and data among States was essential for meaningful mitigation strategies and remediation measures.

45. Some delegations were of the view that all relevant information related to the re-entry of space debris into the Earth's atmosphere should be reported diligently and expeditiously to countries that might be affected.

46. The view was expressed that data on space debris should be transparently accessible to all countries.

47. The view was expressed that collaborative mechanisms should be sought in order to establish an international, multinational and/or national registry of operators, which would include contact information, information on data centres for the storage and exchange of information on space objects and operational information, and information-sharing procedures.

48. Some delegations expressed the view that it was a responsibility of all spacefaring nations to implement the mitigation measures on a voluntary basis through their respective national mechanisms.

49. Some delegations were of the view that developing countries should benefit from technical assistance in space debris monitoring provided by spacefaring nations.

50. The view was expressed that developing countries should be enabled to mitigate space debris through capacity-building and transfer of technology, since all States, regardless of their technology and level of development, were equally exposed to the same risks.
51. The view was expressed that retro-reflectors should be mounted on all massive objects, including those which would become inactive after launch, which would enable greater accuracy in determining the position of orbital elements and increase the efficiency of collision avoidance manoeuvres.
52. The view was expressed that, in connection with the problem of space debris, States should take into account the fact that the Earth's space environment was a limited resource.
53. The Subcommittee agreed that States, in particular spacefaring nations, should pay greater attention to the problem of collisions of space objects, including those with nuclear power sources on board, with space debris and to other aspects of space debris, including its re-entry into the atmosphere.
54. Some delegations expressed the view that States should take action to improve technology for monitoring of such debris as a matter of priority.
55. The Subcommittee noted that the General Assembly, in its resolution 67/113, 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.
56. 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.
57. Some delegations were of the view that information on actions to reduce the creation of space debris should be made available to the Committee, in particular by those States which were largely responsible for creating space debris and by the States that had the capacity to take action with regard to space debris mitigation.
58. The Subcommittee agreed that Member States and international organizations with permanent observer status with the Committee should 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 ways in which debris mitigation guidelines were being implemented.

[...]. Use of nuclear power sources in outer space

59. In accordance with General Assembly resolution 67/113, the Subcommittee considered agenda item 11, "Use of nuclear power sources in outer space".
60. The representatives of the United States and Venezuela (Bolivarian Republic of) and the representative of Guatemala, on behalf of the Group of Latin American and Caribbean States, made statements under agenda item 11. During the general

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

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

(a) “Curiosity’s first six months on Mars: from touchdown to drilling rocks”, by the representative of the United States;

(b) “Discussion about the safety issues of space nuclear reactor power system ground tests?”, by the representative of China.

62. The Subcommittee encouraged States and international intergovernmental organizations to begin or to continue implementing the Safety Framework for Nuclear Power Source Applications in Outer Space (A/AC.105/934).

63. The view was expressed that the Safety Framework would facilitate the conduct of such missions on a bilateral and multilateral basis between States and international intergovernmental organizations. The delegation expressing that view was also of the view that the widespread implementation of the Safety Framework would provide assurance to the global community that nuclear power source applications were being developed, launched and used in a safe manner.

64. The view was expressed that the Safety Framework was not adequate in its present form to meet the challenges posed by the use of nuclear power sources in outer space and that, in the regulation of the use of nuclear power sources in outer space, due consideration should be given to relevant norms of international law, the Charter of the United Nations and the United Nations treaties and principles on outer space. The delegation expressing that view was also of the view that there should be greater coordination and interaction between the Scientific and Technical Subcommittee and the Legal Subcommittee in order to develop binding legal instruments to define the responsibility of States in the use of nuclear power sources in outer space and to undertake research on the ways and means of optimizing or substituting for the use of nuclear energy in outer space activities.

65. Some delegations expressed the view that more consideration should be given to the use of nuclear power sources in geostationary orbit and low-Earth orbit in order to address the problem of potential collisions of nuclear power source objects in orbit, as well as their accidental re-entry into the Earth’s atmosphere. Those delegations were of the view that more attention should be given to this matter through adequate strategies, long-term planning and regulations, including the Safety Framework.

66. The view was expressed that the proliferation of nuclear power sources in outer space, including terrestrial orbits, should not be allowed, as the effects of the use of nuclear power sources on humankind and the environment had not been assessed and there was no definite framework establishing responsibilities and introducing technical and legal tools that could effectively address critical situations that might arise because of undue practices.

67. Some delegations expressed the view that it was exclusively States, irrespective of their level of social, economic, scientific or technical development, that had an obligation to engage in the regulatory process associated with the use of nuclear power sources in outer space and that the matter concerned all humanity. Those delegations were of the view that Governments bore international

responsibility for national activities involving the use of nuclear power sources in outer space conducted by governmental and non-governmental organizations and that such activities must be beneficial, not detrimental, to humanity.

68. The view was expressed that the use of nuclear power sources in outer space should be as limited as possible and that, while nuclear power sources were needed for some interplanetary missions, no justification existed for their use in terrestrial orbits, for which other sources of energy were available that were much safer and had been proved to be efficient.

69. Pursuant to General Assembly resolution 67/113, the Working Group on the Use of Nuclear Power Sources in Outer Space was reconvened under the chairmanship of Sam A. Harbison (United Kingdom). The Working Group held three meetings.

70. At its [...] meeting, on [...] February, the Subcommittee endorsed the report of the Working Group, including the summary of information from the workshops organized by the Working Group during the forty-eighth and forty-ninth sessions of the Subcommittee, in 2011 and 2012. The report of the Working Group is contained in annex [...] to the present report.
