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## Committee on the Peaceful

## Uses of Outer Space

### Fiftieth session

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## Report of the Scientific and Technical Subcommittee on its forty-fourth session, held in Vienna from 12 to 23 February 2007

### Contents

	<i>Paragraphs</i>	<i>Page</i>
I. Introduction . . . . .	1-26	3
A. Attendance . . . . .	3-7	3
B. Adoption of the agenda . . . . .	8	4
C. General statements . . . . .	9-16	4
D. National reports . . . . .	17	5
E. Symposium . . . . .	18-19	6
F. Coordination of space activities within the United Nations system and inter-agency cooperation . . . . .	20-25	6
G. Adoption of the report of the Scientific and Technical Subcommittee . . . . .	26	7
II. United Nations Programme on Space Applications . . . . .	27-54	7
A. Activities of the United Nations Programme on Space Applications . . . . .	31-41	8
B. International Space Information Service . . . . .	42-43	11
C. Regional and interregional cooperation . . . . .	44-54	11
III. Implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) . . . . .	55-67	13

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IV.	Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment. . . . .	68-78	15
V.	Space debris. . . . .	79-101	17
VI.	Use of nuclear power sources in outer space . . . . .	102-114	20
VII.	Near-Earth objects. . . . .	115-125	22
VIII.	Space-system-based disaster management support. . . . .	126-142	23
IX.	International Heliophysical Year 2007 . . . . .	143-158	27
X.	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 . . . . .	159-167	29
XI.	Draft provisional agenda for the forty-fifth session of the Scientific and Technical Subcommittee . . . . .	168-171	30
Annexes			
I.	Report of the Working Group of the Whole . . . . .		32
II.	Report of the Working Group on the Use of Nuclear Power Sources in Outer Space . . . . .		37
III.	Report of the Working Group on Near Earth Objects. . . . .		40
IV.	Space debris mitigation guidelines of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space. . . . .		42

## I. Introduction

1. The Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space held its forty-fourth session at the United Nations Office at Vienna from 12 to 23 February 2007 under the chairmanship of Mazlan Othman (Malaysia).
2. The Subcommittee held 20 meetings.

### A. Attendance

3. Representatives of the following 50 member States of the Committee attended the session: Algeria, Argentina, Australia, Austria, Brazil, Burkina Faso, Canada, Chile, China, Colombia, Cuba, Czech Republic, Ecuador, Egypt, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Italy, Japan, Kazakhstan, Libyan Arab Jamahiriya, Malaysia, Morocco, Nigeria, Pakistan, Peru, Philippines, Poland, Portugal, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Slovakia, South Africa, Spain, Sudan, Sweden, Syrian Arab Republic, Thailand, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, Venezuela (Bolivarian Republic of) and Viet Nam.
4. At the 658th meeting, on 12 February, the Chairman informed the Subcommittee that requests had been received from Angola, Bolivia, the Dominican Republic, Paraguay, Switzerland, the former Yugoslav Republic of Macedonia and Tunisia to attend the session as observers. Following past practice, those States were invited to send delegations to attend the current session of the Subcommittee and address it, as appropriate, without prejudice to further requests of that nature; that action did not involve any decision of the Subcommittee concerning status but was a courtesy that the Subcommittee extended to those delegations. The Subcommittee took note of the application by Switzerland for membership in the Committee (A/AC.105/C.1/2007/CRP.12). The Subcommittee heard a statement by the observer for Bolivia on that State's application for membership in the Committee. The Subcommittee also heard a statement by the observer for Guatemala.
5. The following United Nations entities were represented at the session by observers: the United Nations Institute for Training and Research (UNITAR), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the World Health Organization (WHO), the International Telecommunication Union (ITU), the World Meteorological Organization (WMO) and the International Atomic Energy Agency (IAEA).
6. The following were also represented by observers: the Association of Space Explorers (ASE), the Committee on Earth Observation Satellites (CEOS), the Committee on Space Research (COSPAR), the European Space Agency (ESA), EURISY, the European Space Policy Institute (ESPI), the International Academy of Astronautics (IAA), the International Astronautical Federation (IAF), the International Astronomical Union (IAU), the International Society for Photogrammetry and Remote Sensing (ISPRS), the International Space University (ISU), the Planetary Society (TPS), the Space Generation Advisory Council (SGAC) and the Spaceweek International Association (SIA). The European Organisation for Astronomical Research in the Southern Hemisphere (ESO) attended the session and

requested permanent observer status with the Committee (A/AC.105/C.1/2007/CRP.8).

7. 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/INF/36.

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

8. At its 658th meeting, on 12 February 2007, the Subcommittee adopted the following agenda:

1. Adoption of the agenda.
2. Statement by the Chairman.
3. General exchange of views and introduction to 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. Use of nuclear power sources in outer space.
9. Near-Earth objects.
10. Space-system-based disaster management support.
11. International Heliophysical Year 2007.
12. 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.
13. Draft provisional agenda for the forty-fifth session of the Scientific and Technical Subcommittee.
14. Report to the Committee on the Peaceful Uses of Outer Space.

## **C. General statements**

9. The Subcommittee welcomed the election of Mazlan Othman (Malaysia) as Chairman of its forty-fourth session. The Subcommittee expressed its appreciation to the outgoing Chairman, B. N. Suresh (India), for his leadership and contributions in furthering the achievements of the Subcommittee during his term of office.

10. Condolences were conveyed to Indonesia, Kenya, the Philippines and other countries for the loss of lives and destruction of property as a result of natural disasters. It was noted that there was greater urgency in the work of the Subcommittee to expand space-based applications for disaster prevention and recovery.

11. Statements were made by representatives of the following member States during the general exchange of views: Algeria, Austria, Brazil, Canada, Chile, China, Colombia, Cuba, Czech Republic, Ecuador, France, Germany, Hungary, India, Indonesia, Iran (Islamic Republic of), Italy, Japan, Malaysia, Morocco, Nigeria, Pakistan, Poland, Republic of Korea, Romania, Russian Federation, South Africa, Syrian Arab Republic, Thailand, United States and Venezuela (Bolivarian Republic of). General statements were made by the observers for Switzerland, UNESCO, COSPAR, EURISY, IAA, IAF and IAU.

12. At the 658th meeting, the Chairman made a statement outlining the work of the Subcommittee at its current session and reviewing the global space activities of the previous year, including important advances that had been made as a result of international cooperation.

13. At the 661st meeting, the Director of the Office for Outer Space Affairs of the Secretariat made a statement reviewing the work programme of the Office.

14. The Subcommittee noted the remarkable convergence of anniversaries in 2007, which included the fiftieth anniversary of the space age, the fortieth anniversary of the entry into force of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (General Assembly resolution 2222 (XXI), annex), the fiftieth session of the Committee on the Peaceful Uses of Outer Space and the celebration of the International Heliophysical Year 2007, and welcomed the opportunity that that convergence posed to increase awareness of the relevance and importance of space applications to the betterment of the human condition.

15. The Subcommittee was of the view that a special session might be held during the sixty-second session of the General Assembly to commemorate the fortieth anniversary of the entry into force of the Outer Space Treaty, and requested the Secretariat to report to the Committee at its fiftieth session on the feasibility of holding such an event.

16. Some delegations expressed their concern about the risk that the creation of space debris, intentional or otherwise, represented to human spaceflight, space infrastructure and space activities. Those delegations were of the view that all possible steps should be taken to minimize the proliferation of space debris and that it was important that the Subcommittee approve the draft space debris mitigation guidelines.

#### **D. National reports**

17. The Subcommittee took note with appreciation of the reports submitted by Member States (A/AC.105/887 and Add.1 and A/AC.105/C.1/2007/CRP.3) 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**

18. Pursuant to General Assembly resolution 61/111 of 14 December 2006, a scientific symposium on the theme “Use of the equatorial orbit for space science and applications: challenges and opportunities” was held on 12 and 13 February 2007. It was moderated by J. L. Fellous of COSPAR and J. V. Zimmerman of IAF.

19. The presentations to the symposium included the following: “Use of the equatorial orbit for telecommunications and navigation satellites”, by M. Wittig of ESA; “Long-term, high-resolution observation of the extra-terrestrial solar output from 150 to 2500 nm”, by M. Weber of the University of Bremen; “The CNES/ISRO joint project on low inclination orbit to observe the low-latitude water cycle”, by J. L. Fellous of COSPAR; “GEO occupancy analyser tool (GOAT)”, by J. Restrepo of the Ministry of Communications of Colombia; “Use of the equatorial orbit for space science missions: the X-ray astronomy satellite BeppoSAX and the  $\gamma$ -ray astronomy satellite AGILE”, by P. Giommi of the Italian Space Agency (ASI); “Developing an equatorial Earth observation satellite system”, by T. Kadri of the National Institute of Aeronautics and Space of Indonesia; “RazakSAT: high-resolution imaging satellite for near equatorial orbit”, by A. Arshad of Astronautic Technology Sdn Bhd, Malaysia; and “Use of the equatorial orbit for the Indian Satellite Navigation Programme” by D. Radhakrishnan of the Indian Space Research Organisation (ISRO).

## **F. Coordination of space activities within the United Nations system and inter-agency cooperation**

20. The Subcommittee noted with satisfaction that the Inter-Agency Meeting on Outer Space Activities had held its twenty-seventh session in Vienna from 17 to 19 January 2007. The Subcommittee had before it the report of the Inter-Agency Meeting on its twenty-seventh session (A/AC.105/885) and the report of the Secretary-General on the coordination of space-related activities within the United Nations system: directions and anticipated results for the period 2007-2008 (A/AC.105/886). The Subcommittee noted that those reports indicated the extent to which space technology and its applications had become essential tools in support of a wide range of United Nations activities aimed at implementing and supporting the goals and decisions of global conferences and summits. The Subcommittee noted that the Inter-Agency Meeting would hold its twenty-eighth session in Geneva from 16 to 18 January 2008.

21. The Subcommittee noted that United Nations entities were continuing to coordinate their activities in support of existing and planned initiatives that contributed to the implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), such as the Global Earth Observation System of Systems (GEOSS) of the Group on Earth Observations (GEO), the Integrated Global

Observing Strategy Partnership, CEOS, the International Charter on Space and Major Disasters and the International Strategy for Disaster Reduction.

22. The Subcommittee noted that the Inter-Agency Meeting had identified many synergies between ongoing space-related activities of United Nations entities with the planned United Nations Platform for Space-based Information for Disaster Management and Emergency Response (SPIDER) and the International Committee on Global Navigation Satellite Systems (ICG).

23. The Subcommittee noted that the Inter-Agency Meeting had invited United Nations entities dealing with humanitarian issues to report on lessons learned and best practices in the use of space-based data for disaster relief efforts and that the Office of the United Nations High Commissioner for Refugees and the Office for the Coordination of Humanitarian Affairs had made presentations on their respective experiences. The Subcommittee also noted that the use of space technologies was making it possible for those responding to humanitarian and natural disaster events to provide critical emergency assistance more effectively and in a shorter period of time.

24. The Subcommittee noted that, following its twenty-seventh session, on 19 January 2007, the Inter-Agency Meeting had held its fourth open informal session for member States and observers of the Committee. The theme "Use of space-derived geospatial data for sustainable development in the United Nations system" was discussed at the fourth session in view of the new agenda item on space-derived geospatial data for sustainable development included on the agenda of the Committee on the Peaceful Uses of Outer Space under a three-year workplan, starting with its fiftieth session.

25. The Subcommittee noted that the Office for Outer Space Affairs had revised and published the brochure entitled "Space solutions for the world's problems: how the United Nations family uses space technology to achieve development goals". It was also noted that the printed brochure was available in Arabic, English, French and Spanish and had also been made available in electronic format on the website dedicated to the coordination of outer space activities within the United Nations system ([www.uncosa.unvienna.org](http://www.uncosa.unvienna.org)).

## **G. Adoption of the report of the Scientific and Technical Subcommittee**

26. After considering the items before it, the Subcommittee, at its 677th meeting, on 23 February 2007, adopted its report to the Committee on the Peaceful Uses of Outer Space, containing its views and recommendations, as set out in the paragraphs below.

## **II. United Nations Programme on Space Applications**

27. In accordance with General Assembly resolution 61/111, the Scientific and Technical Subcommittee continued its consideration of agenda item 4, "United Nations Programme on Space Applications".

28. At the 660th meeting, the Expert on Space Applications made a statement outlining the activities carried out and planned under the United Nations Programme on Space Applications.

29. The representatives of Canada, China, Colombia, India, Japan, Nigeria and the United States made statements under agenda item 4.

30. In accordance with General Assembly resolution 61/111, the Subcommittee, at its 660th meeting, reconvened the Working Group of the Whole, under the chairmanship of Muhammad Nasim Shah (Pakistan). The Working Group of the Whole held eight meetings from 14 to 23 February 2007. At its 8th meeting, on 23 February, the Subcommittee endorsed the report of the Working Group of the Whole, which is contained in annex I to the present report.

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

31. The Subcommittee had before it the report of the Expert on Space Applications (A/AC.105/874). The Subcommittee noted that the United Nations Programme on Space Applications for 2006 had been carried out satisfactorily and commended the work accomplished by the Expert in that regard.

32. The Subcommittee noted with appreciation that, since its previous session, additional resources for 2006 had been provided by various Member States and organizations and had been acknowledged in the report of the Expert (A/AC.105/874, paras. 58-59).

33. The Subcommittee expressed its concern over the still limited financial resources available for carrying out the United Nations Programme on Space Applications and appealed to Member States to support the Programme through voluntary contributions. The Subcommittee was of the view that the limited resources of the United Nations should be focused on the activities with the highest priority. It noted that the United Nations Programme on Space Applications was a priority activity of the Office for Outer Space Affairs.

34. The Subcommittee noted that the United Nations Programme on Space Applications was assisting developing countries and countries with economies in transition in benefiting from space-related activities as proposed in the recommendations of UNISPACE III, in particular those contained in the resolution entitled "The Space Millennium: Vienna Declaration on Space and Human Development",<sup>1</sup> and those contained in the plan of action contained in the report of the Committee on the Peaceful Uses of Outer Space on the review of the implementation of the recommendations of UNISPACE III (A/59/174).

35. The Subcommittee noted that in order to avoid duplication of efforts between the activities of SPIDER and the activities in the thematic area of disaster management of the United Nations Programme on Space Applications, the Programme would aim to integrate disaster management with other thematic areas

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<sup>1</sup> *Report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 19-30 July 1999* (United Nations publication, Sales No. E.00.I.3), chap. I, resolution 1.



such as natural resource management and environmental monitoring, tele-education and telemedicine, and basic space science.

36. The Subcommittee noted that, in addition to the United Nations conferences, training courses, workshops, seminars and symposiums planned for 2007 (see para. 41 below), there would be other activities of the Programme in 2007, which would place emphasis on:

(a) Providing support for capacity-building in developing countries through the regional centres for space science and technology education, affiliated to the United Nations;

(b) Strengthening its long-term fellowship programme to include support for the implementation of pilot projects;

(c) Promoting the participation of youth in space activities;

(d) Supporting or initiating pilot projects as follow-up to activities of the Programme in areas of priority interest to member States;

(e) Providing technical advice, upon request, to Member States, bodies and specialized agencies of the United Nations system and relevant national and international organizations;

(f) Enhancing access to space-related data and other information.

## 1. Year 2006

### *Meetings, seminars, symposiums, training courses and workshops*

37. With regard to the activities of the United Nations Programme on Space Applications carried out in 2006, the Subcommittee expressed its appreciation to the following for co-sponsoring the various workshops, symposiums and training courses that had been held within the framework of the Programme referred to in the report of the Expert on Space Applications (A/AC.105/874, para. 59 and annex I):

(a) The Governments of Austria, China, India, Nepal, the Republic of Korea, South Africa, Spain, the Syrian Arab Republic, Ukraine, the United States and Zambia;

(b) The Amritha Institute of Medical Science, Asia-Pacific Multilateral Cooperation in Space Technology and Applications (AP-MCSTA), the China-Europe Global Navigation Satellite System Technology Training and Cooperation Centre, the China National Space Administration (CNSA), ESA, the General Organization of Remote Sensing (GORS), IAA, IAF, the International Centre for Integrated Mountain Development (ICIMOD), the International Centre for Space Law, the Indian Institute of Astrophysics, ISRO, the Korea Aerospace Research Institute, the National Space Agency of Ukraine, the National Aeronautics and Space Administration (NASA) of the United States, the Space Research Institute of the Austrian Academy of Sciences and the University of Valencia.

### *Long-term fellowships for in-depth training*

38. The Subcommittee expressed appreciation to the Government of Italy, which, through the Politecnico di Torino and the Istituto Superiore Mario Boella and with the collaboration of the Istituto Elettrotecnico Nazionale Galileo Ferraris, had

continued to provide five 12-month fellowships for postgraduate studies in global navigation satellite systems (GNSS) and related applications.

39. The Subcommittee noted that it was important to increase the opportunities for in-depth education in space science, technology and applications through mid-term or long-term fellowships and urged Member States to make such opportunities available at their relevant institutions.

*Technical advisory services*

40. The Subcommittee noted with appreciation the technical advisory services provided under the United Nations Programme on Space Applications in support of activities and projects promoting regional cooperation in space applications, as referred to in the report of the Expert on Space Applications (A/AC.105/874, paras. 36-43).

## **2. Year 2007**

*Meetings, seminars, symposiums, training courses and workshops*

41. The Subcommittee recommended the approval of the following programme of meetings, seminars, symposiums, training courses and workshops, to be organized jointly by the Office for Outer Space Affairs, host Governments and others in 2007:

(a) United Nations/Morocco/European Space Agency International Workshop on the Use of Space Technology for Sustainable Development, to be held in Rabat from 25 to 27 April;

(b) United Nations/Mexico/Pan-American Health Organization Training Course on Satellite Technology for Tele-health, to be held in Mexico City from 25 to 29 June;

(c) United Nations/Russian Federation/European Space Agency Workshop on the Use of Microsatellite Technologies for Monitoring the Environment and Its Impact on Human Health, to be held in Tarusa, Russian Federation, from 3 to 7 September;

(d) United Nations/Austria/European Space Agency Symposium on Space Tools for Monitoring Air Pollution and Managing Energy Resources, to be held in Graz, Austria, from 11 to 14 September;

(e) United Nations/International Astronautical Federation Workshop on the Use of Space Technology for Sustainable Development towards Food Security, to be held in Hyderabad, India, from 21 to 23 September;

(f) United Nations/Viet Nam/European Space Agency Workshop on Forest Management and Environmental Protection, to be held in Hanoi from 5 to 9 November;

(g) United Nations/Argentina/European Space Agency Workshop on Sustainable Development in Mountain Areas of Andean Countries, to be held in Mendoza, Argentina, from 26 to 30 November;

(h) United Nations/European Space Agency/National Aeronautics and Space Administration Workshop on Basic Space Science and the International Heliophysical Year 2007, to be held in Tokyo;

(i) United Nations Workshop on the United Nations Platform for Space-based Information for Disaster Management and Emergency Response;

(j) United Nations Workshop on Space Law, to be held in the second half of 2007;

(k) Workshops and training courses to be organized at the regional centres for space science and technology education, affiliated to the United Nations.

## **B. International Space Information Service**

42. The Subcommittee noted with satisfaction the publication of *Highlights in Space 2006*,<sup>2</sup> which had been compiled from a report prepared by COSPAR and IAF, in cooperation with the International Institute of Space Law. The Subcommittee expressed its appreciation to the contributors for their work.

43. The Subcommittee noted with appreciation that the Secretariat had continued to enhance the International Space Information Service and the website of the Office for Outer Space Affairs ([www.unoosa.org](http://www.unoosa.org)). The Subcommittee also noted with satisfaction that the Secretariat was maintaining a website on the coordination of outer space activities within the United Nations system ([www.uncosa.unvienna.org](http://www.uncosa.unvienna.org)).

## **C. Regional and interregional cooperation**

44. The Subcommittee noted that the highlights of the activities of the regional centres for space science and technology education, affiliated to the United Nations, supported under the United Nations Programme on Space Applications in 2006 and planned activities for 2007 and 2008 were included in the report of the Expert on Space Applications (A/AC.105/874, annex III).

45. The Subcommittee noted that the Government of India had continuously provided strong support to the Centre for Space Science and Technology Education in Asia and the Pacific over the past decade, including by making the appropriate facilities and expertise available to it through ISRO and the Department of Space of India. The Subcommittee also noted that, to date, the Centre had conducted 25 nine-month postgraduate courses: 11 on remote sensing and geographic information system (GIS), 5 on satellite communications, 5 on satellite meteorology and global climate and 4 on space and atmospheric science. The courses had benefited 655 participants from 30 countries in Asia and the Pacific and 26 participants from 16 countries outside the region. It was noted that the Centre had also conducted 16 short-term courses and workshops in the previous 10 years. Having completed a decade of educational activities, the Centre was well on its way to becoming an international centre of excellence in training, education and research.

46. The Subcommittee noted that the campuses in Brazil and Mexico of the Regional Centre for Space Science and Technology Education in Latin America and the Caribbean had started organizing nine-month postgraduate courses in 2003. The Centre was supported by the Governments of Brazil and Mexico. The campus in Brazil was benefiting from the expertise and laboratory and classroom facilities

<sup>2</sup> United Nations publication, Sales No. E.07.I.9.

made available to it by the National Institute for Space Research (INPE) of Brazil. Similar high-quality facilities had been made available on the campus in Mexico, which was supported by the National Institute of Astrophysics, Optics and Electronics of Mexico. The campus in Brazil had already conducted four nine-month postgraduate courses on remote sensing and GIS. The Centre had further conducted six short-term courses and workshops since its inauguration. It was noted that, in 2006, the meeting of the Governing Board of the Centre had reinforced the terms of the agreement for the establishment of the Centre with respect to the adherence of other States in Latin America and the Caribbean to the agreement.

47. The Subcommittee noted that the African Regional Centre for Space Science and Technology – in French Language, had been organizing nine-month postgraduate courses since its inauguration in 1998. Based in Rabat, the Centre was supported by the Government of Morocco and important national institutions such as the Royal Centre for Remote Sensing, the Mohammadia Engineering School, the Hassan II Institute of Agronomy and Veterinary Medicine, the National Institute of Telecommunications and the National Directorate of Meteorology. The Subcommittee noted that the Centre had already conducted eight nine-month postgraduate courses in remote sensing and GIS, satellite communications and satellite meteorology and global climate. Since its inauguration, the Centre had organized 13 short-term workshops and conferences.

48. The Subcommittee noted that the African Regional Centre for Space Science and Technology Education – in English Language, had, since its inauguration in 1998, organized eight nine-month postgraduate courses, in remote sensing and GIS, in satellite meteorology and global climate, in satellite communications and in space and atmospheric science. It had also conducted seven short-term activities. In 2006, 47 participants had completed the programme offered by the Centre. In 2006, the Centre had also become a national focal point for the Nigerian outreach programme on space education, targeting students in secondary school. Located at Obafemi Awolowo University in Ile-Ife, the Centre was strongly supported by the National Space Research and Development Agency of Nigeria. The director of the Centre was seeking the support from Governments of member States in Africa in order to strengthen the operation of the Centre for the benefit of the region.

49. The Subcommittee noted that CNSA, in cooperation with the secretariat of AP-MCSTA, had begun on 10 July 2006 the first of the postgraduate courses on space technology applications based on four education curricula developed by the United Nations. The course was organized and conducted by Beijing University of Aeronautics and Astronautics (BUAA). The Government of China and the secretariat of AP-MCSTA together provided full or partial scholarships to 18 participants from developing countries in the region of Asia and the Pacific. The course consisted of classroom learning at BUAA for nine months and subsequent pilot project research in the home countries of the participants for 6-12 months.

50. The Subcommittee noted that the United Nations Programme on Space Applications had provided technical and financial support to the Fifth Space Conference of the Americas, held in Quito from 24 to 28 July 2006. The Conference had addressed the subjects of international space law, reduction and mitigation of natural disasters, protection of the environment, tele-health and epidemiology, space education and access to knowledge. In the Declaration of San Francisco de Quito, adopted at the conclusion of the Conference, States in Latin America and the

Caribbean were invited to set up national space entities to lay the foundation for a regional entity for cooperation. The Subcommittee took note of the Declaration of San Francisco de Quito and its Action Plan (A/AC.105/C.1/2007/CRP.15).

51. It was noted that the Government of Ecuador had established the pro tempore secretariat of the Fifth Space Conference of the Americas to carry out the plan of action of the Conference. It was also noted that the pro tempore secretariat would be assisted by the Government of Colombia, which had been the host of the Fourth Space Conference of the Americas, and the Government of Guatemala, which would be the host of the Sixth Space Conference of the Americas.

52. The Subcommittee noted that the pro tempore secretariat of the Fifth Space Conference of the Americas had expressed its appreciation for the advisory support in the planning and conduct of the Conference that had been received from the International Group of Experts of the Space Conferences of the Americas, comprised of R. González, C. Rogriguez-Brianza, M. Fea, C. Arévalo, B. Morejón, V. Canuto and S. Camacho. The Subcommittee urged the Group of Experts to provide support for the implementation of the plan of action of the Conference, as well as for the organization of the Sixth Space Conference of the Americas, to be held in 2009.

53. The Subcommittee noted that the Office for Outer Space Affairs had hosted the seventh annual meeting of the Working Group on Education, Training and Capacity-building of CEOS, held in Vienna from 19 to 21 April 2006 (A/AC.105/874, para. 42).

54. The Subcommittee noted with satisfaction that since 2005, the United Nations Programme on Space Applications had oriented its activities to include supporting low-cost or no-cost pilot projects that could contribute to sustainable development at the national, regional and international levels. The increased focus of the Programme on such projects had yielded tangible results (A/AC.105/874, paras. 45-54).

### **III. Implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III)**

55. In accordance with General Assembly resolution 61/111, the Scientific and Technical Subcommittee continued its consideration of agenda item 5, on the implementation of the recommendations of UNISPACE III. Pursuant to paragraph 13 of Assembly resolution 61/111, the Subcommittee requested the Working Group of the Whole, reconvened at its 660th meeting, on 13 February, to consider the issue.

56. At its 677th meeting, on 23 February, the Subcommittee endorsed the recommendations of the Working Group of the Whole concerning the implementation of the recommendations of UNISPACE III, as contained in the report of the Working Group (see annex I).

57. The representatives of Canada, Chile, India, Italy, Japan, Nigeria and the United States made statements on the item. The observers for ISU and SIA also made statements.

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

(a) “Ecuadorian pro tempore secretariat of the Fifth Space Conference of the Americas”, by the representative of Ecuador;

(b) “The Italian Space Centre ‘Luigi Broglio’ in Kenya: space technology for sustainable development”, by the representative of Italy;

(c) “Polish student activities in space research and education”, by the representative of Poland;

(d) “Making satellite technology work for health: WHO priority eHealth programs”, by the observer for WHO;

(e) “Space technology for sustainable agriculture: the Indian scenario”, by the representative of India;

(f) “Space programme of Korea”, by the representative of the Republic of Korea;

(g) “MOA: magnetic field oscillating amplified thrusters”, by the representative of Austria;

(h) “CNES involvement in planetary protection”, by the representative of France.

59. The Subcommittee recalled the importance of implementing the Plan of Action contained in the report of the Committee on the Peaceful Uses of Outer Space on the implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (A/59/174, sect. VI.B) and endorsed by the General Assembly in its resolution 59/2 of 20 October 2004.

60. The Subcommittee noted that, in accordance with paragraph 18 of General Assembly resolution 59/2, the Committee on the Peaceful Uses of Outer Space should continue to consider, in its future sessions, the implementation of the recommendations of UNISPACE III until the Committee considered that concrete results had been achieved.

61. The Subcommittee noted with appreciation that a number of activities and initiatives had been undertaken by Member States in the previous year with a view to contributing to the further implementation of the recommendations of UNISPACE III. The Subcommittee also noted with appreciation the contributions made by United Nations entities and other observers of the Committee to the implementation of those recommendations.

62. The Subcommittee noted the unique contributions that the action teams had made to the efforts to implement the recommendations of UNISPACE III and that the Action Team on Public Health, co-chaired by Canada and WHO, had been re-established and had held a meeting during the session.

63. The Subcommittee noted with appreciation that the International Committee on GNSS (ICG) had held its first meeting in Vienna on 1 and 2 November 2006 to

review and discuss matters relating to GNSS and their applications, in particular the efficiency and safety of transport, search and rescue, geodesy, land management and sustainable development. The Subcommittee also noted that ICG had addressed the enhancement of universal access to, and compatibility and interoperability of, space-based navigation and positioning systems and the integration of those services into national and regional infrastructure, particularly in developing countries. The report of the meeting is contained in document A/AC.105/879. The Subcommittee further noted that the second meeting of ICG would be held in Bangalore, India, in September 2007.

64. The Subcommittee noted that the Committee, at its forty-ninth session, had agreed that member States should be requested to provide input for the development of a concise document that would emphasize the benefits of the use of, and tools offered by, space science and technology and their applications for meeting the challenges being faced, in particular, by developing countries with regard to the issues to be addressed by the Commission on Sustainable Development in the period 2008-2009.<sup>3</sup> In accordance with that agreement, the Working Group of the Whole of the Subcommittee conducted the first review of the draft concise document (A/AC.105/C.1/2006/CRP.6), to be finalized by the Committee at its fiftieth session.

65. The view was expressed that the recommendations of UNISPACE III could be firmly implemented in collaboration with member States, United Nations entities and other international organizations.

66. The view was expressed that the Working Group of the Whole should focus its discussion on the implementation of the following three actions called for in the Plan of Action: maximizing the benefits of existing space capabilities for disaster management; maximizing the benefits of the use and applications of GNSS, to support sustainable development; and enhancing capacity-building in space-related activities.

67. The view was expressed that the use of space technology to counter or mitigate the effects of climate change should be a major focus in the implementation of the recommendations of UNISPACE III.

#### **IV. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment**

68. In accordance with General Assembly resolution 61/111, the Subcommittee continued its consideration of agenda item 6, relating to remote sensing of the Earth.

69. In the course of the discussions, delegations reviewed national and cooperative programmes in remote sensing. Examples were given of national programmes and bilateral, regional and international cooperation. The representatives of Brazil, Canada, China, India, Japan, Nigeria and the United States made statements under the agenda item. The observer for CEOS also made a statement.

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<sup>3</sup> *Official Records of the General Assembly, Sixty-first Session, Supplement No. 20 (A/61/20)*, paras. 64 and 65.

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

(a) “Introducing the China-Brazil Earth resources satellites (CBERS) and their applications”, by the representative of China;

(b) “Role of space-based systems for watershed management: Indian experience”, by the representative of India;

(c) “Topographical mapping and generating digital surface model using remote sensing”, by the representative of Japan;

(d) “Earth observations for small countries and regions”, by the observer for ISU.

71. The Subcommittee emphasized the importance of Earth observation satellite data to support activities in a number of key development areas, for example: hydrology, oceanography, water resource management, fishery, wetland management, monitoring the marine environment, management of coastal zones, agriculture, food security, forestry and deforestation, drought and desertification, land-use management, land administration, natural resource management, prospecting gas and oil reserves, ecosystem studies, monitoring malaria and other vector-borne diseases, environmental monitoring, early warning for disasters, monitoring and controlling forest fires, meteorology, weather monitoring and prediction of special weather conditions, atmospheric circulation, air-quality monitoring and forecasting, monitoring global climate change and greenhouse gases, monitoring ice sheets, high-resolution mapping, urban planning, rural development, transportation management, aviation safety and humanitarian relief.

72. The Subcommittee highlighted the increasing current and future availability of space-based sensors on board satellites such as ADEOS II (MIDORI II), the Advanced Land Observing Satellite (ALOS, also known as “Daichi”), the Earth observing satellites SAC-C and Aquarius, Beijing-1, the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO) satellite, the China-Brazil Earth resources satellites CBERS-2, CBERS-2B, CBERS-3 and CBERS-4, the Communication, Ocean and Meteorological Satellite (COMS), COSMO-SkyMed, the Earth Observing System (EOS) satellites, the Environmental Satellite (Envisat), the Global Climate Observing Mission (GCOM) satellite series, the geostationary operational environmental satellites GOES-10, GOES-West and GOES-13, the Greenhouse Gases Observing Satellite (GOSAT), the Indian remote sensing satellites IRS-1D and IRS-P3, OCEANSAT-1, OCEANSAT-2, RESOURCESAT 1, the Technology Experiment Satellite (TES), CARTOSAT-1, CARTOSAT-2, Jason-2, KOMPSAT-2, KOMPSAT-3, KOMPSAT-5, the land remote sensing satellites Landsat-5 and Landsat-7, the meteorological operational satellite (Metop), the National Polar Orbiting Operational Environmental Satellite System (NPOESS), the Nigeria Earth observation satellites NigeriaSat-1 and NigeriaSat-2, Odin, the Polarization and Anisotropy of Reflectances for Atmospheric Sciences coupled with Observations from a Lidar (PARASOL) satellite, the Synthetic Aperture Radar Satellite (RADARSAT-1 and RADARSAT-2), RazakSAT, Resurs-DK, SAC-D, SAOCOM, SciSat-1, SINASAT, Soil Moisture and Ocean Salinity (SMOS) satellites, the Earth Observation Satellite (SPOT), SSR-1, the Terra satellite carrying the Measurements of Pollution in the Troposphere (MOPITT) instrument,



TerraSAR-X, the Thailand Earth Observation System (THEOS) satellite and the Tropical Rainfall Measuring Mission (TRMM) satellite.

73. The Subcommittee noted a number of international projects in the use of satellite technologies aimed at supporting sustainable development, such as the ALTIKA programme, the Sentinel-Asia Project, the ESA Terrestrial Initiative of Global Environmental Research (TIGER), the information gathering and warning system for disaster and crisis management, which included the Sentinel-Asia Project, and the partnership between Brazil and China relating to the CBERS programme.

74. The Subcommittee emphasized the importance of providing non-discriminatory access to remote sensing data and to derived information at reasonable cost and in a timely manner and of building capacity for the adoption and use of remote sensing technology, in particular to meet the needs of developing countries.

75. The view was expressed that the free availability of high-resolution imagery of sensitive areas on the Internet was a point of concern due to strategic reasons. That delegation proposed that guidelines consistent with the national policies should be evolved to regulate the availability of such sensitive data in the public domain.

76. The Subcommittee encouraged further international cooperation in the use of remote sensing satellites, in particular by sharing experiences and technologies through bilateral, regional and international collaborative projects. The Subcommittee noted the important role played by organizations such as CEOS, IAF and ISPRS and by international entities such as the Integrated Global Observing Strategy Partnership in promoting international cooperation in the use of remote sensing technology, especially for the benefit of developing countries.

77. The Subcommittee noted that GEO was continuing to implement its 10-year Work Plan for a Global Earth Observation System of Systems (GEOSS), which had been endorsed in a resolution by the third Earth Observation Summit, held in Brussels on 16 February 2005. The Subcommittee also noted that GEO had held its third plenary session in Bonn, Germany, in November 2006 and had launched the GEO 2007-2009 Work Plan. The Subcommittee noted with satisfaction that South Africa would host the GEO-IV plenary and ministerial-level meetings in Cape Town from 28 to 30 November 2007.

78. The Subcommittee noted with satisfaction that the European programme Global Monitoring for Environment and Security (GMES) not only fostered cooperation within Europe, but also strengthened international cooperation.

## **V. Space debris**

79. In accordance with General Assembly resolution 61/111, the Scientific and Technical Subcommittee continued its consideration of agenda item 7, "Space debris", in accordance with the workplan adopted by the Subcommittee at its forty-second session (A/AC.105/848, annex II, para. 6).

80. The representatives of Argentina, Australia, Canada, China, the Czech Republic, France, Germany, India, Italy, Japan, Malaysia, the Republic of Korea, the

Russian Federation, South Africa, Ukraine and the United States made statements on the item.

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

(a) “USA: space debris environment and policy updates”, by the representative of the United States;

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

(c) “Main 2006 space debris activities in France”, by the representative of France;

(d) “Results of the GEO region artificial object population research and proposals for the organization of cooperative international GEO space debris monitoring”, by the representative of the Russian Federation.

82. The Subcommittee had before it the following:

(a) 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, containing replies received from Member States on the issue (A/AC.105/888) and A/AC.105/C.1/2007/CRP.10;

(b) Progress report of the Chairman of the Working Group on Space Debris (A/AC.105/C.1/L.284).

83. The Subcommittee agreed that Member States, in particular space-faring countries, should pay more 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, as well as its re-entry into the atmosphere. It noted that the General Assembly, in its resolution 61/111, had called for the continuation of national research on the 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.

84. Some delegations expressed the view that not only must renewed efforts be expended by the Committee on the mitigation of the production of debris, but also the Scientific and Technical Subcommittee must investigate possible ways to remove existing space debris. That would be particularly important for the more highly used altitudes of the low-Earth orbit.

85. Some delegations expressed the view that the destruction of space systems, intentional or otherwise, which generated long-lived debris, should be avoided in line with the space debris mitigation guidelines adopted by the Subcommittee at its current session.

86. The Subcommittee noted with appreciation that a number of approaches and concrete actions, covering various aspects of space debris mitigation, had been

adopted by some States, such as the reorbiting of satellites, passivation, end-of-life operations and the development of specific software and models for space debris mitigation, in accordance with the Inter-Agency Space Debris Coordination Committee (IADC) Space Debris Mitigation Guidelines. The Subcommittee also noted that research was also being conducted on space debris observation technology, space debris environmental modelling and technologies to protect space systems from space debris and to limit a new generation of space debris.

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

88. The Subcommittee recalled that at its forty-third session, consensus had been reached by the Working Group on Space Debris on the draft space debris mitigation guidelines, contained in document A/AC.105/C.1/L.284, and that the Subcommittee had agreed that the draft guidelines would be circulated at the national level to secure consent for approval by the Subcommittee at its forty-fourth session.

89. The Subcommittee noted that it could consult IADC periodically regarding future revisions of the IADC Guidelines due to evolving technologies and debris mitigation practices and that the draft space debris mitigation guidelines of the Subcommittee could be amended in accordance with such revisions.

90. The Subcommittee noted that some States had implemented, through their national agencies, space debris mitigation measures consistent with the IADC Guidelines or had developed their own space debris mitigation standards based on the IADC 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.

91. The Subcommittee agreed that the successful approval of voluntary guidelines by the Subcommittee for the mitigation of space debris would increase mutual understanding on acceptable activities in space and thus enhance stability in space and decrease the likelihood of friction and conflict.

92. The Subcommittee agreed that the space debris mitigation guidelines developed in the Subcommittee would meet the following basic conditions:

(a) They would be technically based on the IADC Space Debris Mitigation Guidelines;

(b) They would be technically consistent with the goals and the substance of the IADC Guidelines;

(c) They would not be more stringent than the IADC Guidelines;

(d) They would remain voluntary and not be legally binding under international law.

93. The view was expressed that a legally non-binding set of guidelines was not sufficient and that the Committee should do more to stress the importance of the guidelines in promoting the safe and peaceful use of outer space.

94. Some delegations expressed the view that the Subcommittee should consider submitting the space debris mitigation guidelines as a draft resolution of the General

Assembly rather than as an addendum to the report of the Committee, in order to highlight the importance of the guidelines and the continued effectiveness of the Committee in addressing major issues affecting long-term access to outer space and its use for peaceful purposes.

95. The view was expressed that the States largely responsible for the creation of the present situation and those having the capability to take action on space debris mitigation should contribute to space debris mitigation efforts in a more significant manner than other States.

96. At its 673rd meeting, the Subcommittee considered the adoption of the draft space debris mitigation guidelines (A/AC.105/C.1/L.284).

97. The Subcommittee agreed with a proposal to amend the last sentence of section 3 of document A/AC.105/C.1/L.284 to read “It is also recognized that exceptions to the implementation of individual guidelines or elements thereof may be justified, for example, by the provisions of the United Nations treaties and principles on outer space”.

98. The view was expressed that although the proposed amendment provided an explicit exception that weakened the general prohibition foreseen by the draft space debris mitigation guidelines, that delegation would not oppose consensus on the adoption of the guidelines.

99. The space debris mitigation guidelines, as amended, were adopted by the Subcommittee at its 673rd meeting and are contained in annex IV to the present report.

100. Some delegations expressed the view that the cooperative approach to solving emerging problems could productively serve as a template for the development of other rules or guidelines based on the need for orderly and predictable conduct in space.

101. The Subcommittee expressed its appreciation to Claudio Portelli (Italy) in his role as Chairman of the Working Group on Space Debris, which had developed the space debris mitigation guidelines adopted by the Subcommittee.

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

102. In accordance with General Assembly resolution 61/111, the Scientific and Technical Subcommittee continued its consideration of agenda item 8, “Use of nuclear power sources in outer space”, under the multi-year workplan for the period 2003-2007, adopted at its fortieth session (A/AC.105/804, annex III) and amended at its forty-second session (A/AC.105/848, annex III).

103. The representatives of Nigeria, the United States and Venezuela (Bolivarian Republic of) made statements under the agenda item.

104. Some delegations were of the view that the NPS applications used in space missions represented a key element needed to meet the challenges and objectives of space exploration.

105. Some delegations were of the view that serious consideration should be given to the possible impact that missions carrying NPS on board could have on human life and the environment.

106. The view was expressed that the use of fission reactors in outer space was a serious threat to humanity. That delegation was of the view that, while the use of NPS for interplanetary missions was feasible, provided that other options for generating nuclear power were optimized, the use of NPS in Earth orbit was not acceptable.

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

108. The view was expressed that the tasks outlined in the timeline of the joint activities of the Subcommittee and IAEA in developing a safety framework for NPS applications in outer space, contained in annex I of document A/AC.105/C.1/L.289, could be accomplished within a shorter time frame.

109. Pursuant to General Assembly resolution 61/111, the Subcommittee, at its 662nd meeting, on 14 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 five meetings.

110. The Subcommittee noted with satisfaction the progress made during the intersessional period by the Working Group, in accordance with the multi-year workplan, on the development of a safety framework for NPS applications in outer space. In particular, the Subcommittee noted the preparation of a document (A/AC.105/C.1/L.289) and the participation of the Working Group at the twentieth session of the IAEA Commission on Safety Standards, held in Vienna on 21 and 22 November 2006.

111. The Subcommittee noted that, at its current session, the Working Group had updated its report entitled “Development of an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable nuclear power source applications in outer space” (A/AC.105/C.1/L.289). The finalized report (A/AC.105/C.1/2007/CRP.16) was adopted by the Working Group using interpretation facilities.<sup>4</sup>

112. At its 674th meeting, on 22 February, the Subcommittee endorsed the report of the Working Group (see annex II to the present report).

113. The Subcommittee endorsed the recommendation of the Working Group that, in order to prepare and publish the safety framework for NPS applications in outer space, a partnership be established between the Subcommittee and IAEA by means of a joint experts group, consisting of representatives of the Subcommittee and of IAEA. In that connection, the Subcommittee endorsed a new workplan proposed by the Working Group for the period 2007-2010.

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<sup>4</sup> The report will be made available as document A/AC.105/C.1/L.289/Rev.1.

114. The Subcommittee expressed its appreciation to Sam A. Harbison (United Kingdom), the Chairman of the Working Group, for his leadership in guiding the work of the Working Group.

## **VII. Near-Earth objects**

115. In accordance with General Assembly resolution 61/111, the Scientific and Technical Subcommittee considered agenda item 9, “Near-Earth objects”, under the three-year workplan amended at its forty-second session (A/AC.105/848, annex II). Pursuant to the workplan, in 2005, international organizations, regional bodies and others active in the field of near-Earth object research were invited to report on their activities.

116. The representatives of the Czech Republic, the Republic of Korea, the United Kingdom and the United States made statements on the item.

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

(a) “Near-Earth objects observation (NEOO) programme”, by the representative of the United States;

(b) “Deflecting NEOs: a pending international challenge”, by the observer for ASE;

(c) “NEO research activities in the Republic of Korea: 2006”, by the representative of the Republic of Korea;

(d) “Prospects of the Russian Federation in international cooperation on the asteroid/comet impact hazard problem”, by the representative of the Russian Federation;

(e) “Possible approaches to implementation of the ‘Citadel-1’ international planetary defence system project”, by the representative of the Russian Federation;

(f) “NEO research activities in Germany”, by the representative of Germany;

(g) “Action Team 14: near-Earth objects; interim report”, by the representative of the United Kingdom.

118. 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.105/863 and Add.1 and 2);

(b) Interim report of the Action Team on Near-Earth Objects (A/AC.105/C.1/L.290).

119. 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.

120. The Subcommittee noted that early detection and precision tracking were the most effective tools for the management of threats posed by near-Earth objects. The Subcommittee noted that a number of teams searching for and investigating near-Earth objects were active in various countries.

121. 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 through such means as spectrographic analysis and near-Earth object fly-bys and landings.

122. 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 international missions to near-Earth objects.

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

124. Pursuant to paragraph 16 of General Assembly resolution 61/111, the Subcommittee, at its 670th meeting, on 20 February, established a working group on near-Earth objects for one year under the chairmanship of Richard Tremayne-Smith (United Kingdom). The Working Group on Near-Earth Objects held two meetings.

125. At its 675th meeting, on 22 February, the Subcommittee endorsed the report of the Working Group on Near-Earth Objects (see annex III of the present report), including the new multi-year workplan proposed by the Working Group for the period 2008-2010.

## **VIII. Space-system-based disaster management support**

126. In accordance with General Assembly resolution 61/111, the Scientific and Technical Subcommittee considered agenda item 10, "Space-system-based disaster management support", under the three-year workplan adopted at its forty-first session (A/AC.105/823, annex II) and amended at its forty-second session (A/AC.105/848, annex I).

127. Statements on the item were made by the representatives of Argentina, Austria, Canada, Chile, China, Colombia, Ecuador, France, Germany, Greece, India, Indonesia, Iran (Islamic Republic of), Japan, Nigeria, the Russian Federation, South Africa, the Syrian Arab Republic, Turkey and the United States. The observer for Switzerland also made a statement.

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

(a) "SPIDER programme", by a representative of the Office for Outer Space Affairs;

(b) “GMES activities in emergency humanitarian mapping: RESPOND experience and lessons learned”, by the observer for the RESPOND programme of GMES;

(c) “Sentinel Asia contributing to disaster management support in the Asia-Pacific region”, by the representative of Japan;

(d) “On the International Charter ‘Space and Major Disasters’”, by the observer for the executive secretariat of the International Charter on Space and Major Disasters;

(e) “GEO activities towards disaster reduction: space observations value”, by the observer for GEO;

(f) “IGOS geohazards: toward an improved use of Earth observations for geohazards mitigation”, by the observer for the IGOS-Geohazards Bureau;

(g) “Use of space-systems for wildland fire early warning, monitoring and decision support in wildfire disaster management”, by the observers for the Global Observation of Forest and Land Cover Dynamics (GOFC-GOLD) and GEO;

(h) “Disaster management”, by the observer for UNITAR;

(i) “Space-based information to support disaster management in Indonesia”, by the representative of Indonesia;

(j) “The scientific experience of basic space research contribution for the use of microsatellite platforms for the warning and liquidation of hazard situations”, by the representative of the Russian Federation.

129. The Subcommittee noted with satisfaction that in paragraph 6 of General Assembly resolution 61/110 of 14 December 2006, the Assembly had decided to establish a programme within the United Nations to provide universal access to all countries and all relevant international and regional organizations to all types of space-based information and services relevant to disaster management.

130. The Subcommittee noted that in paragraph 15 of General Assembly resolution 61/110, the Assembly had agreed that the programme should be named the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (SPIDER), and that it should be implemented as a programme of the Office for Outer Space Affairs under the Director of the Office.

131. The Subcommittee also noted that in paragraph 13 of General Assembly resolution 61/110, the Assembly had requested the Office for Outer Space Affairs to develop a detailed workplan for the programme for 2007 and for the biennium 2008-2009 to be considered during the forty-fourth session of the Subcommittee, taking into consideration the commitments received, and in consultation with the representatives of countries that had provided or would be providing commitments, as well as with the representatives of other countries that had indicated their interest in contributing to the development of the workplan.

132. In accordance with the request from the General Assembly, the Office for Outer Space Affairs presented for consideration by the Subcommittee a proposed platform programme for the period 2007-2009 and a proposed plan of work for 2007 (A/AC.105/C.1/2007/CRP.14).



133. The Subcommittee noted that, in preparing the proposed programme for the period 2007-2009, the Office for Outer Space Affairs had taken into consideration the endorsement by the General Assembly of the recommendation made by the Committee on the Peaceful Uses of Outer Space at its forty-ninth session that the programme have an office in Beijing and an office in Bonn, Germany, and that the activities of the programme be carried out within the proposed implementation framework contained in document A/AC.105/873.

134. The Subcommittee noted that, in preparing the proposed plan of work for 2007, the Office for Outer Space Affairs had also taken into consideration the commitments and indication of future commitments received from Algeria, Argentina, Austria, China, Germany, India, Indonesia, Iran (Islamic Republic of), Italy, Morocco, Nigeria, Romania, the Russian Federation, Switzerland, the Syrian Arab Republic and Turkey. The Subcommittee also noted that during its current session, Chile, Colombia, Ecuador and South Africa had indicated their intention to make commitments to support the proposed workplan.

135. The Subcommittee commended the Office for Outer Space Affairs for the proposed platform programme for the period 2007-2009 and the proposed plan of work for 2007 and noted with satisfaction that the commitments of support made by Member States would enable the activities of the new programme to begin immediately. Commitments from Member States included the provision of secondment of experts, cash and in-kind contributions, including satellite-based data and training and capacity-building facilities, as well as fully furnished and equipped office space in Beijing and in Bonn, Germany.

136. The Subcommittee noted that the Office for Outer Space Affairs would make available the part-time services of one staff member at the Professional level and one executive assistant to coordinate with all partners the implementation of activities in the plan of work of the programme for 2007, including with activities organized under the United Nations Programme on Space Applications.

137. The Subcommittee agreed that the implementation of the new programme should include the following steps:

(a) The Office for Outer Space Affairs should work with China and Germany in setting up, at the earliest date possible, the offices in Beijing and Bonn and should coordinate with the various partners in the implementation of the activities planned for 2007;

(b) In implementing the activities to be carried out in 2007 and in developing the plan of work for the biennium 2008-2009, the Office should consider the contributions and commitments of the network of regional support offices;

(c) The Office should correspond with all Member States, inviting them to make cash and in-kind contributions to implement the SPIDER plan of work for 2007 and to indicate possible commitments of support for the programme in the biennium 2008-2009;

(d) The Office should develop a plan of work for the biennium 2008-2009, to be considered by the Committee at its fiftieth session, taking into consideration the indication of commitments received for the biennium 2008-2009 and building upon the opportunities provided by the network of regional support offices. The

plan of work for the biennium 2008-2009 should also include a proposal for activities to be carried out by a liaison office in Geneva.;

(e) The Office should report to the Scientific and Technical Subcommittee, at its forty-fifth session, on the activities carried out by SPIDER in 2007;

(f) The Office should submit for consideration by the Committee on the Peaceful Uses of Outer Space, at its fiftieth session, a report that presents: a summary of the background of the establishment of SPIDER, including the main considerations put forward by the ad hoc expert group in its reports (A/AC.105/873 and A/AC.105/C.1/L.285); a framework for the operating procedures of the programme, including the coordination of activities among the offices and the network of regional support offices; the resources required to carry out its workplan for the biennium 2008-2009; and the need for the establishment of an advisory board as put forward by the ad hoc expert group in its report to the Committee (A/AC.105/873).

138. The Subcommittee noted with satisfaction that the support provided by the International Charter on Space and Major Disasters was a good example of the value of coordinated Earth observations and the sharing of data and information. Since its establishment five years ago, the Charter had been activated approximately 100 times and had made available satellite-based products to support emergency response activities. Activities organized in 2006 under the Charter included a seminar for representatives of national civil protection agencies from countries in Latin America and the Caribbean, organized by the National Commission on Space Activities (CONAE) of Argentina, with the support of ESA, ASI, the United States Geological Survey and the National Oceanic and Atmospheric Administration (NOAA) of the United States.

139. The Subcommittee also noted with satisfaction the progress made in the implementation of Sentinel Asia project, an initiative being spearheaded by space and disaster management organizations in Asia and the Pacific, and that the achievements of Sentinel Asia had been reported at the thirteenth session of the Asia-Pacific Regional Space Agency Forum.

140. The Subcommittee noted the active involvement of several member States in the activities of a number of international initiatives, including GEOSS, being implemented by GEO, and GMES, being implemented by the European Union and ESA.

141. The Subcommittee noted a number of initiatives that were contributing to the increasing availability and use of space-based solutions to support disaster management, including the development of the Italian-Argentine Satellite System for Emergency Management (SIASGE); the launching of RADARSAT-2, which would strengthen ongoing efforts to detect potential disasters; the use of IRS images and Indian National Satellite System (INSAT)-based communications and telemedicine services for post-disaster relief operations; the acquisition of satellite data from the Advanced Land Observing Satellite ("Daichi") of Japan; the ISRO satellite-based search and rescue network, which helped to save 30 crew members on board the ship *Glory Moon* in 2006; the International Satellite System for Search and Rescue (COSPAS-SARSAT) mission control centre of Nigeria, which had been supporting search and rescue operations in aviation-related disasters; the development of the geological hazard map of Nigeria; and the full and open direct

broadcast of data from NOAA environmental satellites to users worldwide, along with Earth observation data from NASA and Landsat satellites operated by the United States Geological Survey.

142. The view was expressed that delegations of members of the Subcommittee should urge their respective Governments to accede to and/or ratify the Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations,<sup>5</sup> which had entered into force on 8 January 2005. It was noted that the Tampere Convention, which contributed to the greater availability of telecommunication equipment for disaster mitigation and relief, was a legally binding international instrument aimed at helping relief workers bring telecommunication equipment across borders during and after emergencies, with a minimum of difficulty.

## IX. International Heliophysical Year 2007

143. In accordance with General Assembly resolution 61/111, the Scientific and Technical Subcommittee considered agenda item 11, “International Heliophysical Year 2007”, under the three-year workplan adopted at its forty-second session (A/AC.105/848, annex I).

144. The representatives of Canada, China, Germany, Greece, Hungary, India, Indonesia, Italy, Japan, Malaysia, Nigeria, the Republic of Korea and the United States made statements on the item.

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

(a) “IHY 2007: an update on planning and implementation”, by the representative of the United States on behalf of the secretariat of the International Heliophysical Year;

(b) “The International Lunar Decade”, by the observer for the Planetary Society.

146. The Subcommittee had before it a note by the Secretariat on reports on national and regional activities related to the International Heliophysical Year 2007 (A/AC.105/C.1/L.288), containing reports from member States and one observer of the Committee on the Peaceful Uses of Outer Space.

147. The Subcommittee noted with satisfaction that the International Heliophysical Year, celebrated worldwide in 2007, would mark the fiftieth anniversary of the International Geophysical Year, which had been held in 1957, and 50 years of space exploration and that scientists and engineers from Member States would once again come together for an international programme of scientific collaboration on fundamental global questions of Earth and space sciences, in particular on the solar-terrestrial interaction.

148. The Subcommittee also noted with satisfaction that the specific objectives of the International Heliophysical Year had been pursued throughout the world by Member States in the year 2006, were part of ongoing activities in 2007 and would

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<sup>5</sup> United Nations, *Treaty Series*, vol. 2296, No. 40906.

continue in 2008. The specific objectives of the International Heliophysical Year were:

(a) To provide benchmark measurements of the response of the magnetosphere, the ionosphere, the lower atmosphere and the Earth's surface in order to identify global processes and drivers that affected the terrestrial environment and climate;

(b) To further the global study of the Sun-heliosphere system outwards to the heliopause in order to understand the external and historical drivers of geophysical change;

(c) To foster international scientific cooperation in the study of current and future heliophysical phenomena;

(d) To communicate the unique scientific results of the Year to interested members of the scientific community and to the general public.

149. The Subcommittee noted with appreciation the progress made by Member States in the conduct of outreach, educational and research campaigns, and in the deployment of instrument arrays.

150. The Subcommittee noted that, building on the results of the International Geophysical Year, the International Heliophysical Year would expand the study of universal processes in the solar system that affected the interplanetary and terrestrial environments. The study of energetic events in the solar system would pave the way for safe human space travel to the Moon and planets and would serve to inspire the next generation of space physicists.

151. The Subcommittee noted that particular focus had been placed on the following components of the International Heliophysical Year in the year 2007: scientific research; space science instruments; outreach and education; and preserving the history of the International Geophysical Year.

152. The Subcommittee also noted that, during its forty-fourth session, several events devoted to the celebration of the International Heliophysical Year 2007 had been conducted, including the official opening of the International Heliophysical Year 2007 worldwide campaign and the accompanying exhibition on the International Heliophysical Year 2007 at the United Nations Office at Vienna and a one-day workshop on the International Heliophysical Year 2007, hosted in Vienna by the Austrian Academy of Sciences.

153. The Subcommittee noted with satisfaction that the United Nations Basic Space Science Initiative, in cooperation with the secretariat of the International Heliophysical Year, continued to support the deployment in countries throughout the world, in particular in developing countries, of arrays of small instruments such as magnetometers, radio antennas, Global Positioning System (GPS) receivers and all-sky cameras, to provide global measurements of heliospheric phenomena.

154. The Subcommittee noted the workshops conducted within the framework of the International Heliophysical Year, including: a regional workshop on African participation in the International Heliophysical Year and the International Polar Year, held in Cape Town, South Africa, in June 2006; an international seminar on the International Heliophysical Year in Asia and the Pacific, coordinated and hosted by the Government of China in Beijing in October 2006; and the Second United

Nations/National Aeronautics and Space Administration Workshop on the International Heliophysical Year 2007 and Basic Space Science, co-organized by the secretariat of the International Heliophysical Year and the Indian Institute of Astrophysics and held in Bangalore, India, from 27 November to 1 December 2006.

155. The Subcommittee also noted that the third United Nations/National Aeronautics and Space Administration Workshop on Basic Space Science and the International Heliophysical Year 2007 would be hosted by the Government of Japan in Tokyo in 2007 and that two more such workshops were planned for 2008 and 2009, the latter to be hosted by the Government of the Republic of Korea.

156. The Subcommittee further noted that the second European General Assembly of the International Heliophysical Year would be held in Turin, Italy, in June 2007.

157. The Subcommittee also noted that, as part of the outreach and public awareness programmes, several publications devoted to the International Heliophysical Year had been issued, such as a special issue of the magazine *African Skies/Cieux africains* devoted to African participation in the International Heliophysical Year and a special issue of *Physik Journal of Germany*.

158. The Subcommittee noted with satisfaction that there had been calls for further deepening of international collaboration within the framework of the International Heliophysical Year and that, at its forty-fifth session, Member States would continue to report to it on their activities related to the International Heliophysical Year.

## **X. 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**

159. In accordance with General Assembly resolution 61/111, the Scientific and Technical Subcommittee considered agenda item 12, "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," as a single issue/item for discussion.

160. The representatives of Colombia, Ecuador, Greece, Indonesia, Kazakhstan and Venezuela (Bolivarian Republic of) made statements on the item.

161. The Subcommittee noted with satisfaction the launch of the first communication and broadcasting satellite, KazSat1, into geostationary orbit by Kazakhstan in June 2006. The Subcommittee also noted future plans of Kazakhstan to establish a national system of communication satellites, KazSat2 and KazSat3, in conjunction with its new space programme for the period 2008-2020, which is under development.

162. The Subcommittee noted that a representative of Colombia had made a presentation entitled “GEO occupancy analyser tool (GOAT)” at the COSPAR/IAF symposium.

163. Some delegations reiterated the view that the geostationary orbit was a limited natural resource, which ran the risk of becoming saturated. Those delegations were of the view that the exploitation of the geostationary orbit should be rationalized and made available to all countries, irrespective of their current technical capabilities, thus giving them the opportunity to have access to the geostationary orbit under equitable conditions, taking into account in particular the needs of developing countries and the geographical position of certain countries, with the participation and cooperation of ITU. Those delegations therefore considered that the item on the geostationary orbit should remain on the agenda of the Subcommittee for further discussion, with the purpose of continuing to analyse its technical and scientific characteristics.

164. The view was expressed that a study of the history of occupancy of the geostationary orbit using GOAT illustrated the need to review the current mechanisms for the use of that scarce resource. That delegation called for the pursuit of a more equitable and rational utilization of the geostationary orbit.

165. The view was expressed that developed countries should assist developing countries by providing the means and the technological capacity to have equitable access to the geostationary orbit, in order to promote socio-economic development, taking into account the vital role of communication satellites in geostationary orbit in reducing the digital divide.

166. The view was expressed that the Committee on the Peaceful Uses of Outer Space, which had the required competency, should pay increasing attention to the technical, political and legal aspects of access and use of the geostationary orbit with a view to establishing a legal framework and an international regime applying to the geostationary orbit.

167. The view was expressed that the Committee should establish a closer linkage with ITU, the only organization with the mandate to assign radio frequencies and associated orbit positions, in order to contribute to the extent possible to the work of the ITU World Radiocommunication Conference.

## **XI. Draft provisional agenda for the forty-fifth session of the Scientific and Technical Subcommittee**

168. In accordance with General Assembly resolution 61/111, the Scientific and Technical Subcommittee considered proposals for a draft provisional agenda for its forty-fifth session, to be submitted to the Committee on the Peaceful Uses of Outer Space. Pursuant to paragraph 11 of that resolution, the Subcommittee requested the Working Group of the Whole, reconvened at its 660th meeting, on 13 February, to consider the draft provisional agenda for the forty-fifth session of the Subcommittee.

169. The view was expressed that the Committee should consider creating a working group to examine: areas of space traffic management, code of conduct and technical rules of the road; the appropriate multilateral forums in which they might

be discussed; and the recommendations of a workplan that would lead to the implementation of the identified rules.

170. At its 677th meeting, on 23 February, the Subcommittee endorsed the recommendations of the Working Group of the Whole concerning the draft provisional agenda for the forty-fifth session of the Subcommittee, contained in the report of the Working Group of the Whole (see annex I to the present report).

171. The Subcommittee noted that the Secretariat had scheduled the forty-fifth session of the Subcommittee to be held from 11 to 22 February 2008.

## **Annex I**

### **Report of the Working Group of the Whole**

#### **I. Introduction**

1. In accordance with paragraph 13 of General Assembly resolution 61/111 of 14 December 2006, the Scientific and Technical Subcommittee, at its forty-fourth session, reconvened the Working Group of the Whole. The Working Group held eight meetings, from 14 to 23 February 2007. It considered the United Nations Programme on Space Applications, the implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) and the draft provisional agenda for the forty-fifth session of the Subcommittee, to be held in 2008. At its 8th meeting, on 23 February, the Working Group adopted the present report.

2. Muhammad Nasim Shah (Pakistan) was elected Chairman of the Working Group of the Whole at the 660th meeting of the Scientific and Technical Subcommittee, on 13 February. The Working Group had before it, *inter alia*, a list of issues that it should consider (A/AC.105/C.1/2007/CRP.11).

#### **II. United Nations Programme on Space Applications**

3. The Working Group of the Whole also had before it the report of the Expert on Space Applications (A/AC.105/874). It was noted that the Expert had supplemented her report by a statement.

4. The Working Group of the Whole noted the workshops, seminars, symposiums, training courses and long-term fellowships for in-depth training, as well as technical advisory services, that had been proposed to the Subcommittee in the report of the Expert on Space Applications (A/AC.105/874, annex II).

#### **III. Implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space**

5. The Working Group of the Whole had before it the following:

(a) Status of the implementation of the recommendations of UNISPACE III (A/AC.105/C.1/2007/CRP.4);

(b) Promoting greater participation of young people in space science and technology (A/AC.105/C.1/2007/CRP.5);

(c) Draft text for the Committee's contribution to the work of the Commission on Sustainable Development for the thematic cluster 2008-2009 (A/AC.105/C.1/2007/CRP.6);



(d) Contribution of the Committee to the work of the Commission on Sustainable Development for the thematic cluster 2008-2009: input from member States (A/AC.105/C.1/2007/CRP.7).

6. The Working Group of the Whole noted the statement of the observer for the Space Generation Advisory Council (SGAC) on the activities of the Council related to the promotion of space-related activities among young people.

7. The Working Group of the Whole recommended that member States of the Committee, entities of the United Nations system and other organizations having permanent observer status with the Committee should continue to report on their efforts to promote education and opportunities for greater participation of youth in space-related activities.

8. The Working Group of the Whole noted that the Committee at its forty-eighth session had agreed to establish a closer link between its work relating to the implementation of the recommendations of UNISPACE III and the work being carried out by the Commission on Sustainable Development<sup>a</sup> and that, at its forty-ninth session, the Committee had agreed that the Working Group should, during the forty-fourth session of the Subcommittee, conduct the first review of the draft concise document that would emphasize the benefits of the use of, and tools offered by, space science and technology and their applications for meeting the challenges being faced, in particular by developing countries with regard to the issues to be addressed by the Commission on Sustainable Development in the period 2008-2009, to be prepared on the basis of the input received from member States.<sup>b</sup>

9. The Working Group of the Whole invited member States of the Committee, entities of the United Nations system and other organizations having permanent observer status with the Committee to provide further concrete examples of what had been done, was currently being done or was being planned, in particular at the international and regional levels, demonstrating the essential nature of space-related contributions to the thematic cluster 2008-2009 of the Commission on Sustainable Development, and noted that any contributions that member States of the Committee, entities of the United Nations system and other organizations having permanent observer status with the Committee might wish to make for inclusion in the report should be submitted by e-mail to the Secretariat (oosa@unvienna.org) not later than 30 March 2007. The Secretariat would take into account contributions received by then, as well as the statements made on that issue during the discussion in the Working Group in preparing a revised version of the draft concise text contained in A/AC.105/C.1/2007/CRP.6 for consideration by the Committee at its fiftieth session, in 2007.

10. The Working Group of the Whole noted with satisfaction that the Action Team on Public Health (recommendation 6), co-chaired by Canada and the World Health Organization, had met during the forty-fourth session of the Subcommittee.

11. The Working Group of the Whole noted that in 2005, it had aligned its consideration of the implementation of the recommendations of UNISPACE III with the plan of action contained in the report of the Committee on the implementation of

<sup>a</sup> *Official Records of the General Assembly, Sixtieth Session, Supplement No. 20* and corrigendum (A/60/20 and Corr.1), para. 49.

<sup>b</sup> *Ibid.*, *Sixty-first Session, Supplement No. 20* and corrigendum (A/61/20 and Corr.1), para. 64.

the recommendations (A/59/174, sect. VI.B). In the same year, the Working Group had also decided to focus its discussions on three actions: (a) maximizing the benefits of existing space capabilities for disaster management; (b) maximizing the benefits of the use and applications of global navigation satellite systems (GNSS) to support sustainable development; and (c) enhancing capacity-building in space-related activities.

12. The Working Group of the Whole noted that since 2005, member States of the Committee, entities of the United Nations system and other organizations having permanent observer status with the Committee had made further progress in implementing the recommendations of UNISPACE III, as evidenced in discussions in the Working Group in 2006 and as reflected in A/AC.105/C.1/2007/CRP.4.

13. The Working Group of the Whole agreed that the Secretariat should prepare a summary of the status of the further implementation of the recommendations of UNISPACE III as contained in the plan of action in the report of the Committee on the subject (A/59/174, sect. VI.B), taking into account the results of the deliberations on that issue in the Working Group in the period 2005-2007 and on the basis of the contributions received during that period from member States of the Committee, entities of the United Nations system and other organizations having permanent observer status with the Committee. That summary would identify the actions contained in the plan of action that could be considered to have been implemented and would mark them accordingly.

14. The Working Group of the Whole agreed that on the basis of that summary, the Secretariat would, in mid-2007, invite member States of the Committee, entities of the United Nations system and other organizations having permanent observer status with the Committee to report on their activities, focusing on the implementation of the actions in the plan of action that had not yet been implemented. The replies received would be taken into account in preparing a report on the status of the implementation of the recommendations of UNISPACE III in tabular form, to be considered by the Working Group during the forty-fifth session of the Subcommittee. On the basis of that report, the Working Group might wish to consider a strategy on the way forward in its consideration of the implementation of the recommendations of UNISPACE III.

#### **IV. Draft provisional agenda for the forty-fifth session of the Scientific and Technical Subcommittee**

15. The Working Group of the Whole noted that, in accordance with General Assembly resolution 61/111, the Scientific and Technical Subcommittee would submit to the Committee its proposal on the draft provisional agenda for the forty-fifth session of the Subcommittee, to be held in 2008.

16. The Working Group of the Whole recommended that the Subcommittee should consider the following as regular items of its agenda, starting with its forty-fifth session: (a) Space debris; (b) Space-system-based disaster management support; (c) Recent developments in global navigation satellite systems.

17. The Working Group of the Whole recommended that the Subcommittee should consider reports on space debris with an emphasis on mitigation practices under the regular agenda item on space debris.

18. The Working Group of the Whole recommended that the Subcommittee should consider issues related to the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (SPIDER) under the regular agenda item on space-system-based disaster management support and that the agenda item should be included in the list of issues that would be considered in the Working Group, starting at the forty-fifth session of the Subcommittee.

19. The Working Group of the Whole recommended that the Subcommittee should consider issues related to the International Committee on GNSS (ICG), the latest developments in the field of GNSS and new GNSS applications under the regular agenda item on recent developments in global navigation satellite systems.

20. The Working Group of the Whole agreed that the Subcommittee should continue its consideration of the agenda item on the use of nuclear power sources in outer space in accordance with the multi-year workplan agreed by the Working Group on the Use of Nuclear Power Sources in Outer Space, as reflected in paragraph 7 of annex II to the present report.

21. The Working Group of the Whole agreed that the Subcommittee should continue its consideration of the agenda item on near-Earth objects in accordance with the multi-year workplan agreed by the Working Group on Near-Earth Objects, as reflected in paragraph 7 of annex III to the present report.

22. The Working Group of the Whole recommended the following draft provisional agenda for the forty-fifth session of the Scientific and Technical Subcommittee, in 2008:

1. General exchange of views and introduction of reports submitted on national activities.
2. United Nations Programme on Space Applications.
3. Implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III).
4. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment.
5. Space debris.
6. Space-system-based disaster management support.
7. Recent developments in global navigation satellite systems.
8. Items to be considered under workplans:
  - (a) Use of nuclear power sources in outer space;

(Work for 2008 as reflected in the multi-year workplan in paragraph 7 of annex II to the present report)

(b) Near-Earth objects;

(Work for 2008 as reflected in the multi-year workplan in paragraph 7 of annex III to the present report)

(c) International Heliophysical Year 2007.

(Work for 2008 as reflected in the multi-year workplan in paragraph 22 of annex I to the report of the Scientific and Technical Subcommittee (A/AC.105/848))

9. Single issue/item for discussion: Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including, inter alia, 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.
10. Draft provisional agenda for the forty-sixth session of the Scientific and Technical Subcommittee, including identification of subjects to be dealt with as single issues/items for discussion or under multi-year workplans.
11. Report to the Committee on the Peaceful Uses of Outer Space.

23. The Working Group of the Whole agreed that there should be a regular presentation by the secretariat of the Group on Earth Observations (GEO) on the status of the Global Earth Observation System of Systems (GEOSS) scheduled under agenda item 4, on matters relating to remote sensing of the Earth by satellite.

24. The Working Group of the Whole accepted a proposal, co-sponsored by Colombia, the Czech Republic, France, Malaysia, Nigeria, Pakistan, Portugal, Romania and the United States of America, for a new approach to organizing the annual symposium of the International Astronautical Federation (IAF) and the Committee on Space Research (COSPAR), (A/AC.105/C.1/2007/CRP.13). Accordingly, the symposium to strengthen the partnership with industry (the industry symposium), organized by the Office for Outer Space Affairs of the Secretariat, would be held every other year. In the years when the industry symposium would not be held, IAF and COSPAR would alternate in organizing a symposium. Prior to the beginning of each session of the Subcommittee, the organization responsible for organizing the next symposium would provide several potential topics for consideration by the Working Group. On the basis of those proposals, the Working Group would select the topic. The industry symposium would be held during the forty-fifth session of the Subcommittee. IAF would organize a symposium during the forty-sixth session of the Subcommittee.

25. The Working Group of the Whole agreed that the topic, chosen from a list of topics proposed by the Office for Outer Space Affairs, for the 2008 symposium to strengthen the partnership with industry should be "Space industry in emerging space nations". The symposium would consider the role, activities and products of space-related industry in emerging space-using and space-faring countries. The Working Group agreed that the symposium should be held during the first week of the forty-fifth session of the Subcommittee.

26. The Working Group of the Whole recommended that it be reconvened during the forty-fifth session of the Scientific and Technical Subcommittee, in 2008.

## Annex II

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

1. At its 662nd meeting, on 14 February 2007, the Scientific and Technical Subcommittee reconvened its Working Group on the Use of Nuclear Power Sources in Outer Space under the chairmanship of Sam A. Harbison (United Kingdom of Great Britain and Northern Ireland).
2. At the 1st meeting of the Working Group, on 15 February, the Chairman recalled the tasks before the Working Group, as contained in the multi-year workplan covering the period 2003-2007 for developing an international technically based framework of goals and recommendations for the safety of nuclear power source (NPS) applications in outer space, which the Subcommittee had endorsed at its fortieth session (A/AC.105/804, annex III) and amended at its forty-second session (A/AC.105/848, annex III). The Working Group informed the Subcommittee of the progress that had been made to date in achieving the objectives of the workplan for the period 2003-2007.
3. In accordance with the multi-year workplan, the Working Group had the following tasks before it at the forty-fourth session of the Subcommittee:
  - (a) Prepare the final report and recommend an implementation option to the Scientific and Technical Subcommittee;
  - (b) If the recommended implementation option is acceptable to the Subcommittee, prepare a new workplan to carry it out;
  - (c) If the recommended implementation option involves further joint activity with the International Atomic Energy Agency (IAEA), commence early discussions with the Agency to carry that out.
4. The Working Group updated, finalized and adopted its report drafted during its intersessional work in 2006, entitled "Development of an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable nuclear power source applications in outer space", based on document A/AC.105/C.1/L.289. The final report, contained in A/AC.105/C.1/2007/CRP.16, was adopted by the Working Group using interpretation facilities. The Working Group requested the Secretariat to make the final report available to member States, as document A/AC.105/C.1/L.289/Rev.1, shortly after the conclusion of the forty-fourth session of the Subcommittee.
5. The Working Group noted that substantial time had been spent during its informal consultations reviewing changes introduced by the Secretariat to document A/AC.105/C.1/L.289. The Working Group recommends that in future all proposed changes to texts be submitted to the Chairman of the Working Group in the form of a document with revision markings.
6. The Working Group recommended to the Subcommittee that, in order to prepare and publish the safety framework for NPS applications in outer space, a partnership be established between the Subcommittee and IAEA by means of a joint experts group, consisting of representatives of the Subcommittee and of IAEA.

7. For the purpose of establishing a joint STSC/IAEA safety framework development activity for NPS applications in outer space, the Working Group recommended a new multi-year workplan as follows:

Year 2007:

Adopt a schedule of work and complete a draft document preparation profile for review and approval by IAEA and the Subcommittee. Resolve any differences between the workplan of the Subcommittee and the final IAEA document preparation profile. Initiate framework drafting and consultation meetings;

Year 2008:

Hold framework drafting and consultation meetings. Review progress on the draft framework and confirm final version of workplan with the Subcommittee. Prepare draft framework for review by the Subcommittee and IAEA;

Year 2009:

The Subcommittee will review the draft framework. Hold framework drafting and consultation meetings to revise the draft framework based on the comments received from member States of, and other entities represented at, the Subcommittee and IAEA. Prepare final framework.

Year 2010:

Review and endorsement of final framework by the Subcommittee and IAEA. Publish the framework.

8. Annex I of A/AC.105/C.1/2007/CRP.16 provides a representative timeline for the joint experts group and associated activities of the Subcommittee and IAEA.

9. The Working Group requested the Secretariat to invite member States and permanent observers to participate in the joint experts group, to be established by the Subcommittee and IAEA. During the forty-fourth session of the Subcommittee, the following member States and permanent observers indicated their participation in this joint activity: Argentina, China, France, Germany, Iran (Islamic Republic of), Nigeria, Russian Federation, Saudi Arabia, United Kingdom, United States of America and the European Space Agency (ESA).

10. In order to establish the working relationships between the Subcommittee and IAEA, the Working Group requested the Secretariat to submit to IAEA its final report, to be contained in A/AC.105/C.1/L.289/Rev.1, and to invite IAEA to participate in the joint experts group.

11. The Working Group agreed that the work of the joint experts group would be conducted by means of electronic exchange of information, as well as through drafting and consultation meetings, to be held in Vienna. Progress reports and results of the work of the joint experts group will be submitted to the Subcommittee in the official languages of the United Nations. The Working Group also agreed that member States and permanent observers should fund the participation of their experts, including the provision of interpretation, where necessary.

12. The Working Group agreed on the following tentative schedule of meetings of the joint experts group for the year 2007:

9 and 10 May 2007

18-20 June 2007

23-25 October 2007

The Working Group also agreed that the need for any or all of these meetings and their exact timing would be transmitted to all participants in the joint experts group through the Secretariat.

13. At its 5th meeting, on 22 February, the Working Group adopted the present report.

## Annex III

### Report of the Working Group on Near-Earth Objects

1. Pursuant to paragraph 16 of General Assembly resolution 61/111 of 14 December 2006, the Scientific and Technical Subcommittee, at its forty-fourth session, established, for one year, a working group on near-Earth objects, in accordance with the workplan under that item. The Working Group held two meetings, on 21 and 22 February 2007.

2. Mr. Richard Tremayne-Smith (United Kingdom) was elected Chairman of the Working Group on Near-Earth Objects at the 670th meeting of the Subcommittee, on 20 February 2006.

3. In accordance with the workplan under the item on near-Earth objects (A/AC.105/848, annex I, para. 20), the Working Group considered:

(a) Reports by Member States and international organizations on the range of activities related to near-Earth objects;

(b) Work and proposals of the Action Team on Near-Earth Objects related to near-Earth objects;

(c) The range of, and suitable mechanisms for, further work on near-Earth objects.

4. The Working Group noted with satisfaction that intersessional work of the Action Team on Near-Earth Objects had resulted in the interim report of the Action Team (A/AC.105/C.1/L.290).

5. The Working Group had before it a note by the Secretariat with information on research in the field of near-Earth objects carried out by Member States, international organizations and other entities (A/AC.105/863/Add.1 and 2).

6. The Working Group noted that member States had held informal consultations during the forty-fourth session of the Subcommittee, from 20 to 21 February, in order to consider the multi-year workplan for the agenda item on near-Earth objects.

7. The Working Group recommended that the Subcommittee should continue to consider the item on near-Earth objects in accordance with the following new multi-year workplan:

2008 Continue intersessional work and consider the reports submitted in response to the annual request for information on near-Earth object activities. The presentations would focus on national, regional and international collaborative activity for observation and analysis of near-Earth objects. While much progress is being made to reach current targets and new targets are under consideration, there remains a need to better coordinate observations and ensure timely follow-up. Update the interim report of the Action Team on Near-Earth Objects.

2009 Continue annual reporting on near-Earth object activities and intersessional work in preparation for the 2009 theme, which will include an update on near-Earth object missions and submission of



draft procedures related to threat handling at the international level.  
Review and update the interim report.

2010      Continue drafting (or agree on) international procedures for threat handling and review progress with international cooperation and collaboration on observations. Review and update the interim report.

8.      At its 2nd meeting, on 22 February 2007, the Working Group adopted the present report.

## **Annex IV**

### **Space debris mitigation guidelines of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space**

#### **1. Background**

Since the Committee on the Peaceful Uses of Outer Space published its Technical Report on Space Debris in 1999,<sup>a</sup> it has been a common understanding that the current space debris environment poses a risk to spacecraft in Earth orbit. For the purpose of this document, space debris is defined as all man-made objects, including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non-functional. As the population of debris continues to grow, the probability of collisions that could lead to potential damage will consequently increase. In addition, there is also the risk of damage on the ground, if debris survives Earth's atmospheric re-entry. The prompt implementation of appropriate debris mitigation measures is therefore considered a prudent and necessary step towards preserving the outer space environment for future generations.

Historically, the primary sources of space debris in Earth orbits have been (a) accidental and intentional break-ups which produce long-lived debris and (b) debris released intentionally during the operation of launch vehicle orbital stages and spacecraft. In the future, fragments generated by collisions are expected to be a significant source of space debris.

Space debris mitigation measures can be divided into two broad categories: those that curtail the generation of potentially harmful space debris in the near term; and those that limit their generation over the longer term. The former involves the curtailment of the production of mission-related space debris and the avoidance of break-ups. The latter concerns end-of-life procedures that remove decommissioned spacecraft and launch vehicle orbital stages from regions populated by operational spacecraft.

#### **2. Rationale**

The implementation of space debris mitigation measures is recommended since some space debris has the potential to damage spacecraft, leading to loss of mission, or loss of life in the case of manned spacecraft. For manned flight orbits, space debris mitigation measures are highly relevant due to crew safety implications.

A set of mitigation guidelines has been developed by the Inter-Agency Space Debris Coordination Committee (IADC), reflecting the fundamental mitigation elements of a series of existing practices, standards, codes and handbooks developed by a number of national and international organizations. The Committee on the Peaceful Uses of Outer Space acknowledges the benefit of a set of high-level

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<sup>a</sup> United Nations publication, Sales No. E.99.I.17.

qualitative guidelines, having wider acceptance among the global space community. The Working Group on Space Debris was therefore established (by the Scientific and Technical Subcommittee of the Committee) to develop a set of recommended guidelines based on the technical content and the basic definitions of the IADC space debris mitigation guidelines, taking into consideration the United Nations treaties and principles on outer space.

### **3. Application**

Member States and international organizations should voluntarily take measures, through national mechanisms or through their own applicable mechanisms, to ensure that these guidelines are implemented, to the greatest extent feasible, through space debris mitigation practices and procedures.

These guidelines are applicable to mission planning and operation of newly designed spacecraft and orbital stages and, if possible, to existing ones. They are not legally binding under international law.

It is also recognized that exceptions to the implementation of individual guidelines or elements thereof may be justified, for example, by the provisions of the United Nations treaties and principles on outer space.

### **4. Space debris mitigation guidelines**

The following guidelines should be considered for the mission planning, design, manufacture and operational (launch, mission and disposal) phases of spacecraft and launch vehicle orbital stages:

#### **Guideline 1: Limit debris released during normal operations**

Space systems should be designed not to release debris during normal operations. If this is not feasible, the effect of any release of debris on the outer space environment should be minimized.

During the early decades of the space age, launch vehicle and spacecraft designers permitted the intentional release of numerous mission-related objects into Earth orbit, including, among other things, sensor covers, separation mechanisms and deployment articles. Dedicated design efforts, prompted by the recognition of the threat posed by such objects, have proved effective in reducing this source of space debris.

#### **Guideline 2: Minimize the potential for break-ups during operational phases**

Spacecraft and launch vehicle orbital stages should be designed to avoid failure modes which may lead to accidental break-ups. In cases where a condition

leading to such a failure is detected, disposal and passivation measures should be planned and executed to avoid break-ups.

Historically, some break-ups have been caused by space system malfunctions, such as catastrophic failures of propulsion and power systems. By incorporating potential break-up scenarios in failure mode analysis, the probability of these catastrophic events can be reduced.

#### Guideline 3: Limit the probability of accidental collision in orbit

In developing the design and mission profile of spacecraft and launch vehicle stages, the probability of accidental collision with known objects during the system's launch phase and orbital lifetime should be estimated and limited. If available orbital data indicate a potential collision, adjustment of the launch time or an on-orbit avoidance manoeuvre should be considered.

Some accidental collisions have already been identified. Numerous studies indicate that, as the number and mass of space debris increase, the primary source of new space debris is likely to be from collisions. Collision avoidance procedures have already been adopted by some Member States and international organizations.

#### Guideline 4: Avoid intentional destruction and other harmful activities

Recognizing that an increased risk of collision could pose a threat to space operations, the intentional destruction of any on-orbit spacecraft and launch vehicle orbital stages or other harmful activities that generate long-lived debris should be avoided.

When intentional break-ups are necessary, they should be conducted at sufficiently low altitudes to limit the orbital lifetime of resulting fragments.

#### Guideline 5: Minimize potential for post-mission break-ups resulting from stored energy

In order to limit the risk to other spacecraft and launch vehicle orbital stages from accidental break-ups, all on-board sources of stored energy should be depleted or made safe when they are no longer required for mission operations or post-mission disposal.

By far the largest percentage of the catalogued space debris population originated from the fragmentation of spacecraft and launch vehicle orbital stages. The majority of those break-ups were unintentional, many arising from the abandonment of spacecraft and launch vehicle orbital stages with significant amounts of stored energy. The most effective mitigation measures have been the passivation of spacecraft and launch vehicle orbital stages at the end of their mission. Passivation requires the removal of all forms of stored energy, including

residual propellants and compressed fluids and the discharge of electrical storage devices.

Guideline 6: Limit the long-term presence of spacecraft and launch vehicle orbital stages in the low-Earth orbit (LEO) region after the end of their mission

Spacecraft and launch vehicle orbital stages that have terminated their operational phases in orbits that pass through the LEO region should be removed from orbit in a controlled fashion. If this is not possible, they should be disposed of in orbits that avoid their long-term presence in the LEO region.

When making determinations regarding potential solutions for removing objects from LEO, due consideration should be given to ensure that debris that survives to reach the surface of the Earth does not pose an undue risk to people or property, including through environmental pollution caused by hazardous substances.

Guideline 7: Limit the long-term interference of spacecraft and launch vehicle orbital stages with the geosynchronous Earth orbit (GEO) region after the end of their mission

Spacecraft and launch vehicle orbital stages that have terminated their operational phases in orbits that pass through the GEO region should be left in orbits that avoid their long-term interference with the GEO region.

For space objects in or near the GEO region, the potential for future collisions can be reduced by leaving objects at the end of their mission in an orbit above the GEO region such that they will not interfere with, or return to, the GEO region.

## **5. Updates**

Research by Member States and international organizations in the area of space debris should continue in a spirit of international cooperation to maximize the benefits of space debris mitigation initiatives. This document will be reviewed and may be revised, as warranted, in the light of new findings.

## **6. Reference**

The reference version of the IADC space debris mitigation guidelines at the time of the publication of this document is contained in the annex to document A/AC.105/C.1/L.260.

For more in-depth descriptions and recommendations pertaining to space debris mitigation measures, Member States and international organizations may refer to the latest version of the IADC space debris mitigation guidelines and other

supporting documents, which can be found on the IADC website ([www.iadc-online.org](http://www.iadc-online.org)).

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