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## Committee on the Peaceful

### Uses of Outer Space

Forty-ninth session

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## Report of the Scientific and Technical Subcommittee on its forty-third session, held in Vienna from 20 February to 3 March 2006

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## I. Introduction

1. The Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space held its forty-third session at the United Nations Office at Vienna from 20 February to 3 March 2006 under the chairmanship of B. N. Suresh (India).
2. The Subcommittee held 20 meetings.

### A. Attendance

3. Representatives of the following member States of the Committee attended the session: Algeria, Argentina, Austria, Belgium, Brazil, Bulgaria, Burkina Faso, Canada, Chile, China, Colombia, Cuba, Czech Republic, Ecuador, Egypt, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Italy, Japan, Kazakhstan, Libyan Arab Jamahiriya, Malaysia, Mexico, Morocco, Netherlands, 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, Uruguay, Venezuela (Bolivarian Republic of) and Viet Nam.
4. At the 638th and 643rd meetings, on 20 and 22 February, the Chairman informed the Subcommittee that requests had been received from Angola, Azerbaijan, Belarus, Bolivia, the Dominican Republic, Switzerland, Tunisia, Yemen and Zimbabwe 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.
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 European Space Agency (ESA), EURISY, the European Space Policy Institute (ESPI), the International Astronautical Federation (IAF), the International Society for Photogrammetry and Remote Sensing (ISPRS), the International Space University (ISU), the Space Generation Advisory Council (SGAC) and the Spaceweek International Association (SIA).
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/35.

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

8. At its 638th meeting, on 20 February 2006, the Subcommittee adopted the following agenda:

1. Adoption of the agenda.
2. Election of the Chair.
3. Statement by the Chair.
4. General exchange of views and introduction to reports submitted on national activities.
5. United Nations Programme on Space Applications.
6. Implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III).
7. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment.
8. Space debris.
9. Use of nuclear power sources in outer space.
10. Space-system-based telemedicine.
11. Near-Earth objects.
12. Space-system-based disaster management support.
13. International Heliophysical Year 2007.
14. Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including in the field of space communications, as well as other questions relating to developments in space communications, taking particular account of the needs and interests of developing countries.
15. Draft provisional agenda for the forty-fourth session of the Scientific and Technical Subcommittee.
16. Report to the Committee on the Peaceful Uses of Outer Space.

## **C. Election of the Chairman**

9. At its 638th meeting, the Subcommittee elected B. N. Suresh (India) Chairman of its forty-third session and Mazlan Othman (Malaysia) Chairman of its forty-fourth session, pursuant to General Assembly resolution 60/99 of 8 December 2005.

## D. General statements

10. The Subcommittee welcomed the election of Mr. Suresh as its Chairman for a one-year term, starting in 2006, and Ms. Othman for the following one-year term, starting in 2007. The Subcommittee expressed its appreciation to the outgoing Chairman, Dumitru-Dorin Prunariu (Romania), for his leadership and contributions in furthering the achievements of the Subcommittee during his two-year term.
11. The view was expressed that, while that arrangement would enable the Subcommittee to carry out its work as scheduled, that solution should not set a precedent for future elections.
12. Condolences were conveyed to Pakistan and the Philippines, as well as to other countries, for the loss of lives as a result of 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.
13. Condolences were also conveyed to Italy and other ESA member States for the passing away of Antonio Rodota, who had been Director General of ESA from 1997 to 2003.
14. China was congratulated for the successful launch of its second manned mission and the United States was congratulated for the successful return to flight of the Space Shuttle.
15. Statements were made by representatives of the following member States during the general exchange of views: Argentina, Austria, Brazil, Canada, China, Colombia, Cuba, Czech Republic, Ecuador, France, Germany, Hungary, India, Indonesia, Iran (Islamic Republic of), Italy, Japan, Malaysia, Nigeria, Pakistan, Poland, Republic of Korea, Romania, Russian Federation, South Africa, Syrian Arab Republic, Thailand, United Kingdom, United States, Venezuela (Bolivarian Republic of) and Viet Nam. General statements were made by the observers for UNESCO, ESA, IAF and ISPRS.
16. The Subcommittee heard the following technical presentation under this item: "Perspectives of the Russian programme of fundamental space research for 2006-2015", by a representative of the Russian Federation.
17. At the 638th 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.
18. Also at the 638th meeting, the Director of the Office for Outer Space Affairs of the Secretariat made a statement reviewing the work programme of the Office.
19. The Subcommittee took note with appreciation of the non-paper on the celebration of the fiftieth anniversary of the space age in 2007 and recommended that the preliminary plans for the celebration be further discussed and elaborated during the forty-ninth session of the Committee under the item "Other matters".

20. The Subcommittee noted that the Group of Latin American and Caribbean States had endorsed, by acclamation, the candidature of *Ciro Arévalo Yepes* (Colombia) for the office of Chairman of the Committee on the Peaceful Uses of Outer Space for the period 2008-2009 (A/AC.105/C.1/2006/CRP.15).

### **E. National reports**

21. The Subcommittee took note with appreciation of the reports submitted by Member States (A/AC.105/857 and Add.1 and A/AC.105/C.1/2006/CRP.3 and Add.1) for its consideration under agenda item 4, "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.

### **F. Symposium**

22. Pursuant to General Assembly resolution 60/99, an industry symposium on the theme "Synthetic aperture radar missions and their applications" was held on 20 February 2006. It was moderated by *Lothar Beckel* of Geospace.

23. The presentations to the symposium included the following: "Synthetic aperture radar (SAR) data for sustainable development", by *G. Staples*, MacDonald Dettwiler Geospatial Services; "ERS/ENVISAT ASAR data products and services", by *A. Celentano*, Eurimage; "Use of ERS altimeter data within the REFERENCE3D production project", by *C. Cortes* and *L. Tripon*, Spot Image; "Applications of SAR for sustainable social and economic development in India", by *M.Y.S. Prasad*, Antrix Corporation; "Operational satellite-based oil spill and ship detection services: a case study from Northern Europe", by *A. Jensen*, Kongsberg Satellite Services AS; "TerraSAR-X products, services and applications", by *J. Herrmann*, Infoterra; "COSMO-SkyMed: products and user services", by *E. Lopinto*, Italian Space Agency (ASI); "Use of SAR data in maritime applications", by *G. Riccobono*, Telespazio; "The TerraSAR-X mission: a German public-private-partnership undertaking", by *R. Werninghaus*, German Aerospace Center (DLR); and "ALOS/PALSAR: overview and expected results", by *T. Tadono*, Japan Aerospace Exploration Agency (JAXA).

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

24. The Subcommittee noted with satisfaction that the Inter-Agency Meeting on Outer Space Activities had held its twenty-sixth session in Paris from 18 to 20 January 2006. The Subcommittee had before it the report of the Inter-Agency Meeting on its twenty-sixth session (A/AC.105/859) 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 2006-2007 (A/AC.105/858). The Subcommittee noted that the twenty-seventh session of the Inter-Agency Meeting would be held in Vienna from 17 to 19 January 2007.

25. The Subcommittee noted that the Inter-Agency Meeting at its twenty-sixth session had considered two new agenda items: “Participation of United Nations entities in the process of the Group on Earth Observations”; and “Lessons learned from applications of space technology in support of disaster relief efforts”. In that regard, the Subcommittee also noted that the Inter-Agency Meeting would invite United Nations agencies dealing with humanitarian issues to report at its twenty-seventh session on the lessons learned from the application of space-based data for disaster relief efforts (A/AC.105/859, para. 70).

26. The Subcommittee noted that the Inter-Agency Meeting had updated the list of space-related initiatives of the member States of the Committee on the Peaceful Uses of Outer Space and the entities of the United Nations system that had responded to specific recommendations contained in the Plan of Implementation of the World Summit on Sustainable Development (see A/AC.105/C.1/2006/CRP.4). The Subcommittee noted that the list was a useful tool to avoid duplication of efforts and to create synergies among end-users and space-capability providers interested in implementing actions called for in the Plan of Implementation. The Subcommittee also noted that the Office for Outer Space Affairs had created a web page that facilitated the navigation of the list ([www.uncosa.unvienna.org/wssd/index.html](http://www.uncosa.unvienna.org/wssd/index.html)).

27. The Subcommittee noted that, following its twenty-sixth session, on 20 January 2006, the Inter-Agency Meeting held its third open informal session for member States of and observers for the Committee. The theme “Space technology for sustainable development and disaster management: opportunities within the United Nations system” was discussed at the third open session. The Subcommittee took note of the invitation of the Inter-Agency Meeting to propose possible themes for its fourth open informal session.

28. The Subcommittee noted that the brochure entitled “Space solutions for the world’s problems: how the United Nations family is using space technology for sustainable development”, which had been issued by the Inter-Agency Meeting, had been translated into French and Spanish. The Subcommittee also noted that the Inter-Agency Meeting would update the brochure so that it would also cover the use of space applications in peacekeeping operations, food security and disaster reduction.

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

29. After considering the items before it, the Subcommittee, at its 657th meeting, on 3 March 2006, 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**

30. In accordance with General Assembly resolution 60/99, the Scientific and Technical Subcommittee continued its consideration of agenda item 5, "United Nations Programme on Space Applications".

31. At the 640th meeting, the Expert on Space Applications made a statement outlining the activities carried out and planned under the United Nations Programme on Space Applications.

32. The representatives of Brazil, Canada, China, Japan, India, Mexico, Morocco and the United States made statements under this agenda item.

33. The Subcommittee heard a technical presentation by the representative of South Africa entitled "Southern African Large Telescope (SALT)" under this agenda item.

34. In accordance with General Assembly resolution 60/99, the Subcommittee, at its 641st meeting, reconvened the Working Group of the Whole, under the chairmanship of Muhammad Nasim Shah (Pakistan). The Working Group of the Whole held nine meetings from 21 February to 3 March. At its 656th meeting, on 3 March, 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**

35. The Subcommittee had before it the report of the Expert on Space Applications (A/AC.105/861). The Subcommittee noted that the United Nations Programme on Space Applications for 2005 had been carried out satisfactorily and commended the work accomplished by the Expert in that regard.

36. The Subcommittee noted with appreciation that, since its previous session, additional resources for 2005 had been provided by various Member States and organizations and had been acknowledged in the report of the Expert (A/AC.105/861, paras. 51-52).

37. 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 the priority activity of the Office for Outer Space Affairs.

38. 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 the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (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).

39. The Subcommittee noted that, in addition to the United Nations conferences, training courses, workshops, seminars and symposiums planned for 2006 (see para. 44 below), there would be other activities of the Programme in 2006, 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 2005

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

40. With regard to the activities of the United Nations Programme on Space Applications carried out in 2005, the Subcommittee expressed its appreciation to the Governments of Algeria, Argentina, Australia, Austria, Brazil, China, Japan, Nigeria, Sweden, the United Arab Emirates and the United States, as well as to the Economic and Social Commission for Asia and the Pacific, UNESCO, ESA, the International Academy of Astronautics and IAF, 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.105/861, para. 52 and annex I).

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

41. 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 provided four 12-month fellowships for postgraduate studies in global navigation satellite systems (GNSS) and related applications.

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

*Technical advisory services*

43. 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.105/861, paras. 32-40).

**2. Year 2006**

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

44. 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 2006:

(a) United Nations/European Space Agency/International Centre for Integrated Mountain Development Expert Meeting on Remote Sensing Projects for the Hindu Kush Himalaya, to be held in Kathmandu from 6 to 10 March;

(b) United Nations/Syrian Arab Republic/European Space Agency Regional Workshop on the Use of Space Technology for Disaster Management in Western Asia and Northern Africa, to be held in Damascus from 22 to 26 April;

(c) United Nations/Zambia Regional Workshop on the Application of Global Navigation Satellite System Technologies for Sub-Saharan Africa, to be held in Lusaka from 26 to 30 June;

(d) United Nations/Austria/European Space Agency Symposium on Space Applications for Sustainable Development: Supporting the Plan of Implementation of the World Summit on Sustainable Development to be held in Graz, Austria, in September;

(e) United Nations/International Astronautical Federation Workshop on the Use of Space Technologies for Water Management, to be held in Valencia, Spain, on 29 and 30 September;

(f) United Nations Seventh International Academy of Astronautics Workshop on Small Satellites in the Service of Developing Countries, to be held in Valencia, Spain, on 3 October;

(g) United Nations/European Space Agency Training Course on Global Navigation Satellite System Applications, to be held in China in November;

(h) United Nations/Ukraine Workshop on Space Law, to be held in Ukraine from 6 to 9 November;

(i) United Nations Workshop on Basic Space Science: Solar and Heliospheric Sciences, to be held in Bangalore, India, from 27 November to 1 December;

(j) United Nations/South Africa Training Course on Satellite-Aided Search and Rescue, to be held in South Africa in November/December;

(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**

45. The Subcommittee noted with satisfaction that the seventeenth and final in the series of documents containing selected papers from the activities of the United Nations Programme on Space Applications, entitled *Seminars of the United Nations Programme on Space Applications*, had been issued. The Subcommittee also noted with satisfaction the publication of *Highlights in Space 2005*,<sup>2</sup> which had been compiled from a report prepared by IAF, in cooperation with the International Institute of Space Law. The Subcommittee expressed its appreciation to the contributors for their work.

46. The Subcommittee noted with appreciation that the Secretariat had continued to enhance the International Space Information Service and the newly improved and enhanced 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**

47. The Subcommittee noted with appreciation the continued work of the United Nations Programme on Space Applications, in accordance with General Assembly resolution 45/72 of 11 December 1990, in leading an international effort to establish regional centres for space science and technology education in existing national or regional educational institutions in developing countries. The Subcommittee also noted that, once established, each centre could expand and become part of a network that could cover specific programme elements in established institutions related to space science and technology in each region.

48. The Subcommittee recalled that the General Assembly, in its resolution 50/27 of 6 December 1995, had endorsed the recommendation of the Committee that the centres be established on the basis of affiliation to the United Nations as early as possible and that such affiliation would provide the centres with the necessary recognition and would strengthen the possibilities of attracting donors and of establishing academic relationships with national and international space-related institutions.

49. The Subcommittee also noted that the General Assembly, in its resolution 60/99, had agreed that the regional centres should continue to report to the Committee on their activities on an annual basis.

50. The Subcommittee noted with satisfaction that in 2005 the Programme had made efforts: (a) to support the development of web pages for all the regional centres; (b) to disseminate worldwide information on the educational activities of the regional centres; (c) to submit information on the regional centres for inclusion in international directories and newsletters; (d) to develop information panels on regional centres for incorporation in the permanent space exhibit of the Office for Outer Space Affairs in Vienna; (e) to arrange for presentations on the accomplishments of the regional centres to be made at the sessions of the Committee on the Peaceful Uses of Outer Space and during activities organized

under the Programme; and (f) to establish a common accounting procedure for the financial resources provided by the Programme to the regional centres.

51. The Subcommittee also noted that the highlights of the activities of the regional centres supported under the Programme in 2005 and planned activities for 2006 and 2007 were included in the report of the Expert on Space Applications (A/AC.105/861, annex III).

52. The Subcommittee noted with satisfaction that the Centre for Space Science and Technology Education for Asia and the Pacific, located in Ahmedabad and Dehra Dun, India, had celebrated its tenth anniversary in 2005 and had made exemplary achievements. The Subcommittee also noted that the Centre was developing a framework of courses, in addition to the four courses of the education curricula developed by the United Nations, focusing on the application of space technology in the areas of disaster management, tele-health and the management of natural resources.

53. The Subcommittee noted that the African Regional Centre for Space Science and Technology Education—in English Language, located in Ile-Ife, Nigeria, was currently conducting a postgraduate course on Satellite Communications and Remote Sensing/Geographical Information Systems (GIS).

54. The Subcommittee noted that the African Regional Centre for Space Science and Technology—in French Language, located in Rabat, was currently conducting a postgraduate course in Remote Sensing and GIS.

55. The Subcommittee noted that the Brazil Campus of the Centre for Space Science and Technology Education in Latin America and the Caribbean had conducted a third postgraduate course on Remote Sensing and GIS in 2005 and would be holding a fourth such course in March 2006. In addition to the nine-month postgraduate courses, the Centre also provided short-term courses on remote sensing and cartography at both its Brazil and Mexico campuses. The Subcommittee noted that the Regional Centre for Space Science and Technology Education in Latin America and the Caribbean (RECTEALC) wished to see increased participation by other Latin American and Caribbean countries within the framework created by the agreement for the establishment of the Centre. The Subcommittee also noted that the Centre would be cooperating with the pro tempore secretariat of the Space Conference of the Americas.

56. The Subcommittee noted that the China National Space Administration, in cooperation with the secretariat of the Asia-Pacific Multilateral Cooperation in Space Technology and Applications (AP-MCSTA), would hold its first nine-month postgraduate course on space technology applications based on the four educational curricula developed by the United Nations. The course would be organized and conducted by the Beijing University of Aeronautics and Astronautics. The Government of China and the AP-MCSTA secretariat would jointly provide full and partial scholarships to some participants from developing countries in the region of Asia and the Pacific.

57. In the framework of its work as the pro tempore secretariat of the Fourth Space Conference of the Americas, the Government of Colombia had held a regional workshop on GNSS, attended by regional experts and sponsored jointly by the Office for Outer Space Affairs and the Government of the United States. The

Subcommittee expressed its appreciation for the organization of the workshop, which was tangible evidence of regional cooperation.

58. It was noted that the General Assembly, in its resolution 60/99, had noted with satisfaction that the Government of Ecuador would be hosting the Fifth Space Conference of the Americas in Quito in July 2006. The Subcommittee also noted that the Government of Ecuador had established a national preparatory committee for the Conference and that the Government of Chile would hold a preparatory meeting for the Conference during the International Air and Space Fair (FIDAE) to be held in Santiago on 28 and 29 March 2006.

59. The Subcommittee noted with satisfaction that the first African Leadership Conference on Space Science and Technology for Sustainable Development had been held in Abuja from 23 to 25 November 2005. The Subcommittee also noted that the African Leadership Conference would be held on a biennial basis: the Government of South Africa had offered to host the second Conference, to be held in 2007, and the Government of Algeria had offered to host the third Conference, to be held in 2009.

60. The Subcommittee noted that the 12th meeting of the Asia-Pacific Regional Space Agency Forum held in Kitakyushu, Japan, in October 2005, had focused on the reduction of the impact of natural disasters using space technology. The Subcommittee also noted that the 13th meeting of the Forum would be held in Indonesia in November 2006.

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

61. In accordance with General Assembly resolution 60/99, the Scientific and Technical Subcommittee continued its consideration of agenda item 6, on the implementation of the recommendations of UNISPACE III. Pursuant to paragraph 13 of Assembly resolution 60/99, the Subcommittee requested the Working Group of the Whole, established at its 641st meeting, on 21 February, to consider the issue.

62. At its 656th meeting, on 3 March, 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).

63. The representatives of Canada, Chile, India, Japan, Morocco, Nigeria and the United States made statements on the item. The observers for ESPI, ISU and SGAC also made statements.

64. The Subcommittee once again emphasized 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.

65. The Subcommittee noted that, in accordance with paragraph 18 of General Assembly resolution 59/2, the Committee 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.
66. The Subcommittee noted with satisfaction the progress being made by Member States, through national and regional programmes and activities, as well as bilateral cooperation, to further implement the recommendations of UNISPACE III.
67. 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, including the recommendations on enhancing education and training opportunities, promoting the participation of youth in space-related activities and ensuring public awareness of the importance of space activities.
68. The view was expressed that the implementation of the recommendations of UNISPACE III would help developing countries to meet certain challenges. That delegation was of the view that developed countries could pool their resources to enable developing countries to initiate programmes on space applications that had proved successful in other developing countries.
69. The view was expressed that private industry could be invited to support the implementation of the recommendations of UNISPACE III by contributing to and participating in future projects with well-defined objectives.
70. The view was expressed that complementary bilateral and multilateral activities between States and the strengthening of relations between regional and international frameworks would firmly contribute to the implementation of the recommendations of UNISPACE III.
71. The Subcommittee agreed that the establishment of action teams to implement the recommendations of UNISPACE III was a unique approach in that it allowed the participation of governmental and non-governmental entities in the follow-up to UNISPACE III while preserving the pivotal role of Member States.
72. The Subcommittee noted with appreciation that Member States had continued to contribute to the work of the action teams by participating in those teams which were continuing their work and by implementing the recommendations of those teams which had concluded their work.
73. The Subcommittee agreed that the continued pursuit of the objectives and goals of the action teams demonstrated the willingness and commitment of Member States to maximize the benefits of using space technologies to improve the well-being of humanity.
74. The view was expressed that the follow-up of the recommendations of UNISPACE III should take into consideration local and regional capabilities and needs and that the productive work of the action teams should be followed by the definition and implementation of action plans describing specific goals, means and tasks.

75. The Subcommittee noted with appreciation the progress made with regard to the study on the possibility of creating an international entity to provide for coordination and the means of realistically optimizing the effectiveness of space-based services for use in disaster management. The views of member States and decisions of the Subcommittee with regard to the study are reflected in paragraphs 153-176 of the present report.

76. The Subcommittee noted with appreciation that the International Committee on GNSS (ICG) had been established on a voluntary basis as an informal body to promote cooperation, as appropriate, on matters of mutual interest related to civil satellite-based positioning, navigation, timing and value-added services, as well as the compatibility and interoperability of GNSS systems, while increasing their use to support sustainable development, particularly in developing countries. The Subcommittee noted that the participants interested in establishing ICG had agreed that the Office for Outer Space Affairs would serve, on an interim basis, as the focal point for matters relating to organizing the establishment of an ad hoc working group and the first meeting of ICG.

77. The view was expressed that ICG would be an important mechanism for promoting the benefits of GNSS, particularly in developing countries.

78. The Subcommittee 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 and that the Subcommittee at its current session should review and finalize a concise document on the contribution that space science and technology and their applications could make to the thematic areas to be addressed by the Commission in the period 2006-2007.<sup>3</sup>

79. The Subcommittee had before it a conference room paper containing the contribution of the Committee to the work of the Commission on Sustainable Development for the thematic cluster 2006-2007 (A/AC.105/C.1/2006/CRP.9/Rev.1). The Subcommittee endorsed the text contained in that conference room paper, which had been reviewed and finalized by the Working Group of the Whole, and requested the Office for Outer Space Affairs to transmit the text, in accordance with the agreement reached by the Committee at its forty-eighth session, to the Commission on Sustainable Development at its fourteenth session, to be held from 1 to 12 May 2006.

80. The Subcommittee noted that the head office of the International Satellite System for Search and Rescue (COSPAS-SARSAT), had relocated to Montreal, Canada. The Subcommittee also noted that enhancements were being developed that would enable search and rescue payloads to fly on the Global Positioning System (GPS), Global Navigation Satellite System (GLONASS) and European Satellite Navigation System (Galileo) satellites that would be part of the Medium-Earth Orbit Search and Rescue (MEOSAR) system.

81. The Subcommittee took note with appreciation of the reports by Member States on the promotion and organization of public outreach activities in celebration of World Space Week.

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

82. In accordance with General Assembly resolution 60/99, the Subcommittee continued its consideration of agenda item 7, relating to remote sensing of the Earth.

83. 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, France, Germany, India, Japan, Nigeria, the Republic of Korea and the United States made statements under the agenda item. The observer for UNITAR also made a statement.

84. The representative of Germany made a technical presentation entitled "Remote sensing applications for sustainable development and natural hazards by DLR: current activities".

85. The Subcommittee emphasized the importance of Earth observation satellite data to support activities in a number of key development areas, for example: hydrology, oceanography (including altimetry and sea surface temperature), water resource management, fishing, wetland management, monitoring the marine environment, management of coastal zones and agriculture, food security, forestry and deforestation, drought and desertification, land-use management, land administration and 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 and weather monitoring and prediction of special weather conditions (such as typhoons, floods, yellow sandstorms and red tide), atmospheric circulation and air quality monitoring and forecasting, monitoring global climate change and greenhouse gases, monitoring ice sheets, high-resolution mapping, urban planning, transportation management, aviation safety and humanitarian relief. 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"), Aqua, Aquarius/SAC-D, the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO) satellite, the China-Brazil Earth resources satellites CBERS-2, CBERS-2B, CBERS-3, CBERS-4, the Communication, Ocean and Meteorological Satellite (COMS), COSMO-SkyMed Earth Observing System (EOS) satellites, the Environmental Satellite (Envisat), the Global Climate Observing Mission (GCOM) satellite series, the Geostationary Operational Environmental Satellite (GOES), GOES-R, the Greenhouse Gases Observing Satellite (GOSAT), the Indian remote sensing satellite (IRS), IRS-1C, IRS-1D, IRS-P3, OCEANSAT-1, RESOURCESAT-1, the Technology Experiment Satellite (TES), CARTOSAT-1, Jason 2, KOMPSAT-2, KOMPSAT-3, the Land Remote Sensing Satellite (Landsat-5), Landsat-7, the meteorological operational satellite (Metop), the National Polar-orbiting Operational Environmental Satellite System (NPOESS), NigeriaSat-1, NigeriaSat-2, Oceansat 3, Odin, the Polarization and Anisotropy of Reflectances for Atmospheric Sciences coupled with Observations from a Lidar (PARASOL) satellite, the Synthetic Aperture Radar Satellite (RADARSAT),



SAC-D, SAOCOM, SciSat-1, SINASAT, Soil Moisture and Ocean Salinity (SMOS) satellites, the Earth Observation Satellite (SPOT), SSR-1, Terra, TerraSAR-X and the Tropical Rainfall Measuring Mission (TRMM) satellite.

86. 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 Earth Observation Partnership of the Americas (EOPA), the ESA Terrestrial Initiative of Global Environmental Research (TIGER), the Megha-Tropiques programme, the Pleiades project, the Vegetation and Environment Monitoring on a New Microsatellite (VEN $\mu$ S) programme, the Global Precipitation Measurement (GPM) mission, the information gathering and warning system for disaster and crisis management, which included the pilot project "Sentinel-Asia", and the strategic partnership between Brazil and China relating to the CBERS programme. The Subcommittee noted with satisfaction the establishment by French authorities in French Guiana of a centre for monitoring environmental change in the Amazon and the Caribbean.

87. 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.

88. 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 the Committee on Earth Observation Satellites, 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.

89. The Subcommittee noted that the Group on Earth Observations (GEO) was continuing to implement its concept 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 concept was designed to make tangible contributions to global society in nine broad socio-economic areas. The Subcommittee also noted that significant progress had been made by GEO during 2005 in establishing GEO governance relationships and in developing the 2006 GEO Work Plan.

90. 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.

91. The Subcommittee noted that the Third International Conference on Early Warning, to be held in Bonn, Germany, from 27 to 29 March 2006, would deal with the application of satellite-based remote sensing for disaster prevention.

## V. Space debris

92. In accordance with General Assembly resolution 60/99, the Scientific and Technical Subcommittee continued its consideration of agenda item 8, "Space debris", in accordance with the workplan adopted by the Subcommittee at its forty-second session (A/AC.105/848, annex II, para. 6).

93. The representatives of Canada, China, France, India, Italy, Japan, the Russian Federation, Ukraine, the United Kingdom and the United States made statements on the item.

94. The Subcommittee heard the following scientific and technical presentations on the subject of space debris:

(a) "IADC observation campaigns", by the observer for the European Space Agency (ESA);

(b) "United States space debris research", by the representative of the United States;

(c) "Recent space debris mitigation activities in France" by the representative of France;

(d) "The new space programme of the Russian Federation and space debris problem", by the representative of the Russian Federation.

95. 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.105/862);

(b) Progress report of the Chairman of the Working Group on Space Debris (A/AC.105/2006/CRP.19);

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

96. 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 nuclear power sources (NPS) on board and problems relating to their collision with space debris.

97. 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 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 60/99, 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.

98. In this connection, some delegations expressed the view that not only must renewed efforts be expended in the Committee on mitigation of the production of debris, but also that the Scientific and Technical Subcommittee must move on to investigating possible ways to remove space debris already existing in space. That would be particularly important for the more highly travelled altitudes of the low-Earth orbit.

99. 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 re-orbiting 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 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 were also being conducted.

100. Pursuant to paragraph 14 of General Assembly resolution 60/99, the Subcommittee, at its 648th meeting, on 27 February, re-established the Working Group on Space Debris, under the chairmanship of Claudio Portelli (Italy), to review the draft space debris mitigation guidelines of the Subcommittee arising from the intersessional and informal meetings of the Working Group.

101. At its 654th meeting, on 1 March, the Subcommittee endorsed the report of the Working Group on Space Debris (see annex II to the present report).

102. The Scientific and Technical Subcommittee noted with appreciation the progress made by the Working Group on Space Debris on the development of the draft space debris mitigation guidelines of the Subcommittee and that consensus had been reached within the Working Group on the text of draft guidelines, contained in document A/AC.105/C.1/L.284, based on and consistent with the technical content of the IADC Guidelines. The Subcommittee also noted that the IADC Guidelines had been referenced as a document of a technical nature, while the space debris mitigation guidelines of the Subcommittee would contain general recommendations and would not be more technically stringent than the IADC Guidelines.

103. The Subcommittee agreed that its draft space debris mitigation guidelines would be circulated at the national level to secure consent for approval of the guidelines by the Subcommittee at its forty-fourth session, in 2007.

104. 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.

105. The Subcommittee noted that the future space debris mitigation guidelines of the Subcommittee, should they be adopted, shall be implemented on a voluntary basis and through national mechanisms and shall not be legally binding under international law.

106. 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.

107. The view was expressed that the successful negotiation of voluntary guidelines for the mitigation of space debris would increase the mutual understanding of acceptable activities in space and thus enhance stability in space and decrease the likelihood of friction and conflict.

108. Some delegations expressed the view that, in order for States to continue having unrestricted access to outer space, all space-faring countries should take the lead and implement space debris mitigation practices in their national activities as expeditiously as possible.

109. The view was expressed that 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.

110. The view was reiterated that the outer space environment should be preserved, and early warning systems should be activated, to enable all States, in particular developing countries, to explore outer space for peaceful purposes and conduct space activities without any constraints.

111. The view was expressed that the issue of space debris should also be considered by the Legal Subcommittee.

112. The view was expressed that space debris mitigation practices were not limited by the licensing of a space system but continued with the treaty-derived need for supervision and control, which was necessary throughout the operational and disposal phases of a space system.

113. The view was reiterated that compliance with all space debris mitigation measures would involve additional costs for all commercial operators, and it would therefore be desirable to explore ways and means of providing technical and economic support.

114. The Subcommittee expressed its appreciation to the Chairman of the Working Group and to the acting Chairman, Detlef Alwes (Germany), for their able leadership and dedication to the work of the Working Group. The Subcommittee also noted with appreciation the commitment of member States of the Committee in striving to develop the draft space debris mitigation guidelines.

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

115. In accordance with General Assembly resolution 60/99, the Scientific and Technical Subcommittee continued its consideration of agenda item 9, "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).

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

117. The Subcommittee noted with satisfaction the successful conclusion of work of the Joint Technical Workshop on the Objectives, Scope and General Attributes of a Potential Technical Safety Framework for Nuclear Power Sources in Outer Space, which had been organized by the Subcommittee and IAEA in Vienna from 20 to 22 February 2006, pursuant to General Assembly resolution 60/99.

118. The members of the Subcommittee expressed their gratitude to IAEA for having co-sponsored the workshop. They also thanked the Government of the United States for having sponsored the interpretation services provided for the Workshop.

119. The Subcommittee agreed that continued effort towards the establishing 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 should be encouraged.

120. The view was expressed that Member States had agreed in the Vienna Declaration to advance scientific knowledge of space and protect the near and outer space environments through research on designs, safety measures and procedures associated with the use of NPS in outer space. That delegation was of the view that all users of space should consider the possible consequences of their ongoing or planned NPS activities in space before further irreversible actions were taken that could affect the future utilization of near or outer space.

121. The view was expressed that the NPS applications used in space missions represented a key element that could assist all States in meeting the challenges and objectives of space exploration, taking into consideration that discussions regarding NPS at the national and international levels should have a solid technical foundation.

122. The view was expressed that missions carrying NPS on board should seriously consider the possible impact that such sources could have on human life and the environment. That delegation expressed its concern over the lack of a specific commitment for establishing a work timeline leading to regulation, by the Committee, of existing or planned missions using NPS on board.

123. The Subcommittee noted the recent successful launch by the United States of the first robotic scientific mission to Pluto, which was made possible by a nuclear power source, providing vital spacecraft power and instrument heating.

124. Pursuant to General Assembly resolution 60/99, the Subcommittee, at its 644th meeting, on 23 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.

125. The Subcommittee noted with satisfaction the excellent progress made during the intersessional period by the Working Group, in accordance with the multi-year workplan, on the development of potential implementation options for establishing

an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable NPS applications in outer space.

126. The Subcommittee noted that, at its current session, the Working Group had discussed the results of the workshop and developed a preliminary draft report of the workshop (see the appendix of annex III to the present report).

127. At its 5th meeting, on 1 March, the Subcommittee endorsed the report of the Working Group (see annex III to the present report).

128. The Subcommittee endorsed the recommendation of the Working Group that it continue intersessional work on the topics described in the multi-year workplan as endorsed by the Subcommittee at its fortieth session (A/AC.105/804, annex III) and amended at its forty-second session (A/AC.105/848, annex III). The Subcommittee noted that the Working Group had agreed to hold its intersessional meeting in Vienna from 12 to 14 June 2006, during the forty-ninth session of the Committee on the Peaceful Uses of Outer Space.

129. The Subcommittee expressed its appreciation to the Chairman of the Working Group for his leadership in ably guiding the work of the Working Group.

## **VII. Space-system-based telemedicine**

130. In accordance with General Assembly resolution 60/99, the Scientific and Technical Subcommittee considered agenda item 10, "Space-system-based telemedicine", under the three-year workplan adopted by the Committee at its forty-sixth session.<sup>4</sup> Pursuant to the workplan, in 2006, member States of the Committee were invited to make presentations on possible bilateral or multilateral projects that would further develop space-based telemedicine applications through international cooperation.

131. The representatives of Argentina, Canada, Chile, China, France, India, Italy, Nigeria and the United States made statements on the item.

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

(a) "The international seminar 'Application of space methods for studying the problems of human health, potentially dangerous and catastrophic phenomena with the use of universal micro-satellite platforms'", by the representative of the Russian Federation;

(b) "Special satellite communication system for the development of telemedicine services in the Russian Federation", by the representative of the Russian Federation;

(c) "Terrestrial benefits of advanced healthcare technologies developed and used by NASA", by the representative of the United States.

133. The Subcommittee noted the use of space technology for early warning and monitoring of indicators of dengue, Chagas' disease, malaria, leishmaniasis, hantavirus, meningitis, pneumopathies, avian flu, haemorrhagic fever, yellow fever and other zoonotic, airborne and waterborne diseases. The Subcommittee noted

ongoing bilateral projects for monitoring outbreaks of those diseases, as well as plans for similar multilateral projects.

134. The Subcommittee noted that the capabilities developed for long-duration space flight were applied to provide medical services in disaster-hit areas, in rural and remote locations and on board aeroplanes. The Subcommittee also noted that knowledge of human health in outer space was being successfully used in standard medical practices, in particular in cases involving long periods of bed rest.

135. The Subcommittee noted that telemedicine was becoming an integral component of health care and that it was applied in offsite radiological services, cardiac monitoring, specialist referrals, correctional care and tele-education in medical sciences. The Subcommittee also noted that telemedicine reduced travel time for practitioners and hospitalization periods and that it was being readily accepted by patients. The Subcommittee further noted that recent developments in telecommunications, biomedical technologies and small electronic devices, as well as lower technology costs and the availability of the Internet, had expanded the possibilities for providing telemedicine services globally.

136. The Subcommittee took note of bilateral and multilateral projects that demonstrated and evaluated new medical diagnostic and therapeutic technologies to enhance the delivery of state-of-the-art medical care in remote areas and harsh environments.

137. The Subcommittee noted that space-system-based telemedicine could bridge disparities in the quality of medical services in different parts of a country by providing access to a database of expert knowledge and connectivity for data transfer in areas with underdeveloped infrastructure. In that regard, the Subcommittee also noted the broader use of space-based telemedicine and the operationalization of projects in space-system-based telemedicine at the national level.

138. The Subcommittee noted with appreciation regional capacity-building activities, as well as the establishment of task forces at the national and regional levels to develop project proposals using space technology for health services. The Subcommittee also noted that the Office for Outer Space Affairs and several space agencies had held, in 2005, two regional workshops on the use of space technology for human health for countries in Asia and the Pacific and in Latin America and the Caribbean.

139. The Subcommittee noted that success in the application of space technologies in health care depended on their cost-effectiveness. The Subcommittee also noted with satisfaction that obstacles to the development of telemedicine, such as ethical and regulatory barriers, as well as lack of acceptance of the use of telemedicine by the traditional medical establishment, were being overcome.

140. The Subcommittee noted with satisfaction that a number of planned satellites would be used to provide, among other things, telemedicine services.

141. The Subcommittee urged Member States to continue to initiate bilateral and multilateral cooperative projects in space-system-based telemedicine in developing countries, in order to bring better health-care services to the populations of those countries. The Subcommittee also urged the specialized agencies of the United Nations system involved in health-related areas to explore possibilities of working

with Member States in developing and implementing projects in space-system-based telemedicine.

## **VIII. Near-Earth objects**

142. In accordance with General Assembly resolution 60/99, the Scientific and Technical Subcommittee considered agenda item 11, “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.

143. The Subcommittee had before it a note by the Secretariat (A/AC.105/863) containing information on research in the field of near-Earth objects carried out by Germany, Italy and Norway. The Subcommittee had also before it a conference room paper (A/AC.105/C.1/2006/CRP.5) containing information on research in the field of near-Earth objects carried out by the Russian Federation and the United Kingdom.

144. The representatives of Italy, the United Kingdom and the United States made statements on the item. The observer for ASE also made a statement on the item.

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

(a) “Near-Earth object research activities in the Republic of Korea: 2005 progress report”, by the representative of the Republic of Korea;

(b) “Near-Earth object-related activities in the United Kingdom”, by the representative of the United Kingdom;

(c) “Near-Earth object deflection: an international challenge”, by the observer for ASE;

(d) “The need for an international near-Earth object committee”, by the observer for the International Space University.

146. The Subcommittee recalled that near-Earth objects were asteroids and comets with orbits that could cross the orbit of the planet Earth.

147. The Subcommittee noted that the interest to 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 resources on them.

148. 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 also noted that a number of teams searching near-Earth objects and investigating them were active in various countries.

149. The Subcommittee noted 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.



150. 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.

151. The Subcommittee commended the United States for the significant progress achieved in reaching its target of detecting 90 per cent of all the near-Earth objects larger than one kilometre in diameter. The Subcommittee noted that the United States had discovered 816 near-Earth objects of that size. The Subcommittee also noted with appreciation that the United States was investigating systems to detect and track objects greater than 140 metres in diameter.

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

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

153. In accordance with General Assembly resolution 60/99, the Scientific and Technical Subcommittee considered agenda item 12, "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).

154. Statements on the item were made by the representatives of Austria, China, Colombia, France, Germany, India, Indonesia, Italy, Japan, Malaysia, Nigeria, the Republic of Korea, Romania, the Russian Federation, Thailand, the United Kingdom, the United States and Venezuela (Bolivarian Republic of). The observer for WMO also made a statement.

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

(a) "The application of space technology for the establishment of Indonesia's Tsunami Early Warning System", by the representative of Indonesia;

(b) "JAXA's activities for disaster management support", by the representative of Japan;

(c) "Use of the national space meteorological system for forecasting of man-caused emergency situations", by the representative of the Russian Federation;

(d) "Global wildland fire forecasting using space technologies", by the observer for ISU;

(e) "Disaster reduction and enhancing education for sustainable development", by the observer for UNESCO;

(f) "UNOSAT impact on the work of the United Nations in disaster management and humanitarian relief", by the observer for UNITAR.

156. In accordance with the agreement of the Committee on the Peaceful Uses of Outer Space at its forty-eighth session,<sup>5</sup> the Subcommittee had before it, for its review and recommendation to the Committee, the study of the ad hoc expert group on the possibility of creating an international entity to provide for coordination and

the means of realistically optimizing the effectiveness of space-based services for use in disaster management (A/AC.105/C.1/L.285).

157. The representative of Romania, on behalf of the ad hoc expert group, presented to the Subcommittee an overview of the study (A/AC.105/C.1/2006/CRP.12).

158. The Subcommittee commended the ad hoc expert group for the excellent study that it had prepared for its consideration.

159. The Subcommittee noted that the ad hoc expert group had stressed that the proposed disaster management international space coordination entity (DMISCO) would be a “one-stop shop” to provide support to the disaster management community at large and a platform for fostering alliances, that it would be user-driven and that it would contribute to bridging the gap between the disaster management and space communities.

160. While appreciating the role and functions of the proposed entity, the Subcommittee agreed that its creation should not lead to duplication of efforts and required close consultation between the ad hoc expert group and other organizations that had ongoing initiatives in the use of space technology for disaster management. Those initiatives included the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters, GEOSS which was being implemented by GEO, GMES and programmes and projects such as RESPOND and the UNOSAT programme, which provided operational services in response to emergency relief actions by the Office for the Coordination of Humanitarian Affairs of the Secretariat, and other United Nations entities, in particular the secretariat of the International Strategy for Disaster Reduction (ISDR).

161. The Subcommittee noted that the expert group had also indicated that the entity being proposed should be implemented as a United Nations programme under the leadership of the Office for Outer Space Affairs, located within the Office and/or hosted by Member States offering to provide facilities and partial operational support. The expert group had invited delegations to express their possible commitments towards the establishment of the proposed entity.

162. The Subcommittee noted the offers made by members of the Subcommittee to provide experts and to host the proposed entity.

163. The Subcommittee agreed on the following steps forward with regard to the work of the ad hoc expert group:

(a) The ad hoc expert group, with the assistance of the Office for Outer Space Affairs, should consult those responsible for implementing the initiatives mentioned in paragraph 160 above, with a view to reaching agreement on a division of tasks and on how the proposed entity could contribute to achieving the objectives of those initiatives while enhancing the use of space technologies in disaster management, particularly in developing countries; the results of that coordination should be presented to the Committee on the Peaceful Uses of Outer Space at its forty-ninth session, in 2006, for its consideration;

(b) The Office for Outer Space Affairs should correspond with all member States, requesting them to officially communicate their possible commitments of support to be provided to the proposed entity;

(c) All providers of support would then be invited to meet before the forty-ninth session of the Committee to harmonize their commitments into one viable proposal for the implementation of the entity;

(d) The ad hoc expert group should hold a meeting during the forty-ninth session of the Committee to finalize its report to the Committee, including a proposed implementation plan based on the commitments secured, and to propose a final name for the entity;

(e) The Committee, after its review, would make its recommendation to the General Assembly at its sixty-first session.

164. The view was expressed that the proposed entity could provide technical support, such as knowledge-sharing, pre-disaster preparations, early warning, assessments during and after disasters, recovery and reconstruction, and education and training, and that it could provide practical and training support for the work of the ISDR secretariat. That delegation was of the view that the proposed entity could support and complement other international organizations and initiatives dealing with disaster reduction and management.

165. The view was expressed that there were concerns about the availability of funds, given the resources that would be needed to establish and operate the proposed entity. The view was also expressed that the level of resources proposed in the study of the ad hoc expert group needed a review in the light of the potential for existing international and national activities to provide or support some of the functions of the proposed entity.

166. The view was expressed that the overall approach towards establishing the proposed entity not only should address post-disaster issues, but also should be aimed more at identifying the technology elements that would help in disaster prediction and prevention. That delegation was of the view that a proper merger of remote sensing and meteorological satellite data with ground modelling and processing techniques would result in effective prevention measures.

167. The view was expressed that, with regard to establishing the proposed entity, the ad hoc expert group needed to further examine certain specific issues, including national procedural requirements.

168. The Subcommittee was of the view that international entities such as CEOS, the Coordination Group for Meteorological Satellites and the Committee on the Peaceful Uses of Outer Space were important because of their role in encouraging the development of research satellites, in easing the transition from research assets to operational systems and in helping to ensure that all countries had access to timely and robust data, and that the collaborative efforts of such organizations would help in ensuring that space-based systems were effectively supported and utilized.

169. The Subcommittee noted with satisfaction that the work carried out by the International Charter on Space and Major Disasters over the past year was a successful example of the value of coordinated Earth observations. The

Subcommittee noted that, in 2005, JAXA and the Disaster Monitoring Constellation had joined the Charter and that the China National Space Administration had applied to join the Charter and would provide data support from the CBERS series and the Feng Yun meteorological satellites to the Charter. The Subcommittee further noted that the Charter had been activated a total of 25 times in 2005, an increase of 20 per cent over 2004, contributing to emergency relief efforts in both developing and developed countries.

170. The Subcommittee noted that the purpose of GEOSS was to achieve comprehensive, coordinated and sustained observations of the Earth system in order to improve an understanding of Earth processes and enhance prediction of the behaviour of the Earth system. The Subcommittee also noted that reducing loss of life and property from natural and human-induced disasters was one of the nine societal benefits addressed in the GEO 10-year implementation plan for GEOSS. The Subcommittee further noted that the disaster-related activities of GEO in 2006 would focus on: priorities jointly identified by the GEO Working Group on Tsunami Activities and the Intergovernmental Oceanographic Commission; developing a multi-hazard approach to early warning and crisis management; and expanding the use of Earth observations for disaster prevention and mitigation.

171. The Subcommittee noted with satisfaction the number of new space-based technology solutions and opportunities planned or currently in use by Member States to support disaster management activities. Those included, inter alia, the Italian high-resolution synthetic aperture radar satellite constellation (COSMO-SkyMed); the implementation of the Italian-Argentine Satellite System for the Management of Emergency (SIASGE); the Emergesat coordination tool, which used telecommunication, Earth observation and navigational satellites specifically for the coordination of international assistance during major crises; the GUSTAV project, which would improve the accuracy and reliability of the information relevant to disasters and their mitigation; the plan to establish ground- and space-based facilities for disaster early warning in Nigeria; the Alpbach Summer School, which would focus on the theme “Monitoring of natural hazards from space” in 2006; the Sentinel-Asia project, which would support the sharing of disaster-related information in Asia and the Pacific; the launch by the Republic of Korea of KOMPSAT-1, the proposed launch of KOMPSAT-2, KOMPSAT-3 and COMS; and the recent launch by Japan of ALOS (“Daichi”), which would be able to acquire data useful to a rescue or recovery plan following a disaster.

172. The Subcommittee noted with satisfaction the contribution of space-based technologies in supporting the recovery and reconstruction activities in the aftermath of the Indian Ocean tsunami of 2004, including the setting up of tsunami early warning systems in Indonesia and Malaysia; the establishment in Thailand of the Satellite Imagery-Based Information Center for Tsunami Recovery; and the proposed establishment in India of a tsunami early warning system for the area of the Indian Ocean.

173. The Subcommittee noted that the Asian Conference on Disaster Reduction would be held in Seoul from 15 to 17 March 2006. The aim of the Conference was to identify the challenges and promote the implementation of disaster risk reduction within the context of the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters,<sup>6</sup> which was the outcome of the

World Conference on Disaster Reduction held in Kobe, Japan, from 18 to 22 January 2005.

174. In accordance with the workplan for this agenda item, the Subcommittee also received reports and heard presentations from specialized entities in the United Nations system on their activities in the area of space-system-based disaster management support, as well as regional disaster management structures. Written reports received by the Office for Outer Space Affairs from those agencies were made available to the Subcommittee in A/AC.105/C.1/2006/CRP.13.

175. Also in accordance with the workplan for this agenda item, the Subcommittee held a workshop on disaster management involving communication and meteorological satellite operators on 23 and 24 February. The afternoon of 23 February was dedicated to communication satellite operators and the afternoon of 24 February was dedicated to meteorological satellite operators. The workshop was moderated by J. Akinyede (Nigeria).

176. The following presentations were made at the workshop: “The role of communication and meteorological satellites in disaster management support: the experience of ISRO”, by D. Radhakrishnan of India; “Mobile satellite communications for disaster management”, by J. O’Brien of Iridium Satellite; “Functions of satellite networks in the communication system of EMERCOM of Russia and experience of activities in emergencies”, by E. Osipov of the Russian Federation; “Instant readiness: applications of Inmarsat technology in disaster management”, by P. Maerkedahl Larsen of Inmarsat; “EUMETCast: EUMETSAT’s Broadcast System for Environmental Data”, by G. Bridge of the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT); “Chinese meteorological satellites and applications”, by Fang X. of China; “Spaceborne system for online precursor monitoring of earthquakes and other natural and man-made disasters”, by Y. Ruzhin of the Russian Federation; and “Satellite meteorology: protecting life and property around the world”, by G. Bridge of EUMETSAT. The presentations were followed by a panel discussion on: (a) ways to overcome the obstacles preventing countries, particularly developing countries, from using satellite-based communications and meteorology during natural disasters; and (b) effective steps that communication and meteorological satellite operators could take together in order to enhance the use of communication satellites in managing natural disasters.

## **X. International Heliophysical Year 2007**

177. In accordance with General Assembly resolution 60/99, the Scientific and Technical Subcommittee considered agenda item 13, “International Heliophysical Year 2007”, under the three-year workplan adopted at its forty-second session (A/AC.105/848, annex I).

178. The representatives of China, France, Indonesia, Nigeria and the United States made statements on the item.

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

(a) “CORONAS-F mission: results of the Sun and solar-terrestrial investigations”, by the representative of the Russian Federation;

(b) “Russian Federation satellite experiments for solar-terrestrial physics”, by the representative of the Russian Federation;

(c) “Preparations for the International Heliophysical Year 2007”, by the representative of the United States, on behalf of the secretariat of the International Heliophysical Year.

180. The Subcommittee had before it a conference room paper containing reports of Member States on their activities being planned for the International Heliophysical Year (A/AC.105/C.1/2006/CRP.21).

181. The Subcommittee noted with satisfaction that the Office for Outer Space Affairs, in cooperation with the secretariat of the International Heliophysical Year, had published a booklet entitled *Putting the “I” in the IHY*, which contained an overview of the worldwide preparations for the Year.

182. The Subcommittee noted that the International Heliophysical Year was an international programme for scientific collaboration to understand the external drivers of planetary environments and was of great interest to Member States. The preparations for the Year would involve the deployment of new instrumentation, particularly in developing countries, would include new observations from the ground and in space and would have an educational component.

183. The Subcommittee noted that, building on the results of the International Geophysical Year, observed in 1957, the International Heliophysical Year would expand the study of universal processes in the solar system affecting 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.

184. The Subcommittee noted that 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 Earth’s surface 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.

185. The Subcommittee noted with satisfaction that the United Nations Basic Space Science Initiative, in cooperation with the secretariat of the International Heliophysical Year, was supporting the deployment around the world, in particular in developing countries, of arrays of small instruments such as magnetometers, radio antennas, GPS receivers and all-sky cameras, to provide global measurements of heliospheric phenomena.

186. The Subcommittee noted the programmes and studies being conducted within the framework of the International Heliophysical Year, including: the reactivation of geomagnetic and equatorial electrojet research in Nigeria; the establishment of an integrated, operational, ground-based and large-scale monitoring system in China; the planning of activities in Indonesia aimed at improving and developing predictions of the effects of solar activities and space weather on satellite anomalies, geomagnetism, climate variability and the ionosphere and telecommunication; and the development in France of several microsatellites such as Picard, to provide information on the diameter of the Sun and its possible variations; Taranis, to study the coupling of the atmosphere, the ionosphere and the magnetosphere through recently discovered phenomena of electrical discharge; and LYOT/SMESE, to study high-energy solar phenomena.

187. The Subcommittee also noted that the first European General Assembly of the International Heliophysical Year was held in Paris in January 2006.

188. The Subcommittee further noted that a regional workshop on African participation in the International Heliophysical Year and the International Polar Year would be held in Cape Town, South Africa, in June 2006, and that an international seminar on the International Heliophysical Year in Asia and the Pacific would be coordinated and hosted by China in October 2006.

## **XI. 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**

189. In accordance with General Assembly resolution 60/99, the Scientific and Technical Subcommittee considered agenda item 14, on the geostationary orbit and space communications, as a single issue/item for discussion.

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

191. 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.

192. The view was expressed that developing countries, particularly those in certain geographical positions, should be guaranteed, by legislative means, access and use

of the geostationary orbits and that a certain number of geostationary orbital positions should be reserved for use by developing countries when those countries had developed the necessary technical capacity.

193. 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, taking into account the vital role played by communication satellites in that orbit to reduce the digital divide.

194. The view was reiterated that, in view of the risk of saturation inherent in the geostationary orbit, preference should be given to countries in tropical areas in the assignment of spectrum resources within the geostationary orbit.

195. The Subcommittee noted that Colombia had begun an in-depth study called the geostationary occupancy analyser tool (GOAT), based on the geostationary orbit analysis, that would show the past and present status of the geostationary orbit. The study, which was being carried out with the participation of the Office for Outer Space Affairs and ITU, was expected to be presented to the Committee on the Peaceful Uses of Outer Space at its forty-ninth session, in 2006.

196. The view was expressed that the Committee on the Peaceful Uses of Outer Space should pay increasing attention to legal issues also relating to the access and use of the geostationary orbit and that, for that reason, closer linkage with ITU (the only organization legally authorized to assign radio frequencies and any associated orbits) should be taken into consideration before that topic was discussed further in the subcommittees of the Committee.

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

197. In accordance with General Assembly resolution 60/99, the Scientific and Technical Subcommittee considered proposals for a draft provisional agenda for its forty-fourth session to be submitted to the Committee on the Peaceful Uses of Outer Space. Pursuant to paragraph 13 of that resolution, the Subcommittee requested the Working Group of the Whole, established at its 641st meeting, on 21 February, to consider the draft provisional agenda for the forty-fourth session of the Subcommittee.

198. At its 656th meeting, on 3 March, the Subcommittee endorsed the recommendations of the Working Group of the Whole concerning the draft provisional agenda for the forty-fourth session of the Subcommittee, as contained in the report of the Working Group of the Whole (see annex I to the present report).

199. The Subcommittee noted that the Secretariat had scheduled the forty-fourth session of the Subcommittee to be held from 12 to 23 February 2007.



*Notes*

- <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.
- <sup>2</sup> United Nations publication, Sales No. E.06.I.6.
- <sup>3</sup> *Official Records of the General Assembly, Sixtieth Session, Supplement No. 20* and corrigenda (A/60/20 and Corr.1), paras. 49-52.
- <sup>4</sup> *Ibid.*, *Fifty-eighth Session, Supplement No. 20* (A/58/20), para. 138.
- <sup>5</sup> *Ibid.*, *Sixtieth Session, Supplement No. 20* and corrigenda (A/60/20 and Corr.1), paras. 57-58.
- <sup>6</sup> A/CONF.206/6, chap. I, resolution 2.

## **Annex I**

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

#### **I. Introduction**

1. In accordance with paragraph 13 of General Assembly resolution 60/99 of 8 December 2005, the Scientific and Technical Subcommittee, at its forty-third session, reconvened the Working Group of the Whole. The Working Group of the Whole held 9 meetings, from 21 February to 3 March 2006. 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-fourth session of the Subcommittee, to be held in 2007. At its 9th meeting, on 3 March, the Working Group of the Whole adopted the present report.

2. Muhammad Nasim Shah (Pakistan) was elected Chairman of the Working Group of the Whole at the 641st meeting of the Scientific and Technical Subcommittee, on 21 February. The Working Group of the Whole had before it, *inter alia*, a list of issues that it should consider (A/AC.105/C.1/2006/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.105/861). 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.105/861, 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 papers:

(a) Contribution of the Committee on the Peaceful Uses of Outer Space to the work of the Commission on Sustainable Development for the thematic cluster 2006-2007: input from member States (A/AC.105/C.1/2006/CRP.7);

(b) Contribution of the Committee to the work of the Commission on Sustainable Development for the thematic cluster 2006-2007: discussion paper submitted to the Commission by the major group representing the scientific and technological communities (A/AC.105/C.1/2006/CRP.8);

(c) Draft text for the contribution of the Committee to the work of the Commission on Sustainable Development for the thematic cluster 2006-2007 (A/AC.105/C.1/2006/CRP.9);

(d) Promoting greater participation of young people in space science and engineering (A/AC.105/C.1/2006/CRP.10);

(e) Implementation of the recommendations of UNISPACE III: summary of the actions focused on by the Working Group of the Whole and status of their implementation (A/AC.105/C.1/2006/CRP.14/Rev.1);

(f) Implementation of the recommendations of UNISPACE III: report of the Action Team on Near-Earth Objects (A/AC.105/C.1/2006/CRP.22).

6. The Working Group of the Whole noted that the Committee had agreed at its forty-eighth session 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 and that the Subcommittee should, at its current session, review and finalize a concise document on the contribution that space science and technology and their applications could make to the issues of the thematic cluster of the Commission for the period 2006-2007.

7. The Working Group of the Whole expressed its appreciation to those member States that had provided input for the draft text contained in A/AC.105/C.1/2006/CRP.9.

8. The Working Group revised the draft text for the Committee's contribution to the work of the Commission on Sustainable Development and recommended to the Subcommittee that the revised text (A/AC.105/C.1/2006/CRP.9/Rev.1), be transmitted, in accordance with the agreement reached by the Committee at its forty-eighth session, to the Commission on Sustainable Development at its fourteenth session, to be held from 1 to 12 May 2006.

9. The Working Group of the Whole noted that, by establishing a closer link between the Committee and the Commission, the synergies involving the implementation of the recommendations of UNISPACE III and the overarching development agenda set by the World Summit on Sustainable Development, held in Johannesburg, South Africa, from 26 August to 4 September 2002, would be strengthened.

10. The Working Group of the Whole noted with appreciation that, pursuant to paragraph 6 of General Assembly resolution 59/2 of 20 October 2004, the action teams on an environmental monitoring strategy (recommendation 1), knowledge-sharing (recommendation 9), sustainable development (recommendation 11) and near-Earth objects (recommendation 14) had continued their work on the implementation of the recommendations of UNISPACE III.

11. The Working Group of the Whole noted with satisfaction that the Action Team on Knowledge-Sharing (recommendation 9) and the Action Team on Near-Earth Objects (recommendation 14) had met during the forty-third session of the Subcommittee and that the Action Team on an Environmental Monitoring Strategy (recommendation 1) had met together with the Action Team on Sustainable Development (recommendation 11) during the same session. The Subcommittee had

taken note with satisfaction of the report of the Action Team on Near-Earth Objects on the progress made in its work.

12. The Working Group of the Whole noted with satisfaction that the Action Team on Public Health (recommendation 6) had held a meeting during the forty-third session of the Subcommittee and that agreement had been reached on the way forward for the Action Team. The Working Group of the whole also noted with satisfaction that the World Health Organization had agreed to co-chair the Action Team, if deemed appropriate by the Action Team.

13. The Working Group of the Whole noted with appreciation that, as a consequence of the work of the Action Team on Global Navigation Satellite Systems (recommendation 10) and as reflected in paragraph 76 of the report of the Subcommittee on its forty-third session, the International Committee on GNSS, as recommended by the Action Team, had been established.

14. The Working Group of the Whole noted that the Office for Outer Space Affairs of the Secretariat would continue to assist and support, within existing capabilities and resources, the action teams that had indicated their intention to continue their work.

15. The Working Group of the Whole requested the Secretariat to prepare for the forty-fourth session of the Subcommittee a document that would contain a brief summary of the status of the implementation of the recommendations of UNISPACE III and that the document should be prepared on the basis of information received from Member States of the United Nations, entities of the United Nations system and other organizations having permanent observer status with the Committee, as well as other information gathered by the Office.

16. The Working Group of the Whole welcomed the reports by member States of the Committee and organizations having permanent observer status with the Committee on their activities relating to the promotion of space science and engineering among young people. The Working Group agreed 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 to the Working Group of the Whole on their efforts to promote education and opportunities for greater participation of youth in space science and technology.

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

17. The Working Group of the Whole noted that, in accordance with General Assembly resolution 60/99, the Scientific and Technical Subcommittee would submit to the Committee its proposal on the draft provisional agenda for the forty-fourth session of the Subcommittee, to be held in 2007.

18. The Working Group of the Whole noted that, pursuant to a request from the Legal Subcommittee, the Committee at its forty-eighth session had invited the Scientific and Technical Subcommittee to consider the possibility of preparing a report on the technical characteristics of aerospace objects in the light of the current level of technological advancement and possible developments in the foreseeable future.

19. The Working Group of the Whole agreed to request the Legal Subcommittee, through its Working Group on the Definition and Delimitation of Outer Space, to clarify its invitation and to indicate the exact nature and purpose of such a report, which might include a definition of the character of aerospace objects to be considered and the technical attributes to be taken into account.

20. The Working Group of the Whole recommended that, upon receipt of the information from the Legal Subcommittee, the Scientific and Technical Subcommittee might again be invited to consider the possibility of preparing such a report.

21. The Working Group of the Whole recommended the following draft provisional agenda for the forty-fourth session of the Scientific and Technical Subcommittee, in 2007:

1. General exchange of views and introduction to 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. Items to be considered under workplans:
  - (a) Space debris;  
(Work for 2007 as reflected in the multi-year workplan in paragraph 6 of annex II to the report of the Scientific and Technical Subcommittee (A/AC.105/848))
  - (b) Use of nuclear power sources in outer space;  
(Work for 2007 as reflected in the multi-year workplan in paragraph 8 of annex III to the report of the Scientific and Technical Subcommittee (A/AC.105/848))
  - (c) Near-Earth objects;  
(Work for 2007 as reflected in the multi-year workplan in paragraph 20 of annex I of the report of the Scientific and Technical Subcommittee (A/AC.105/848))
  - (d) Space-system-based disaster management support;  
(Work for 2007 as reflected in paragraph 15 of annex II to the report of the Scientific and Technical Subcommittee (A/AC.105/823))

(e) International Heliophysical Year 2007.

(Work for 2007 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))

6. 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.
  7. Draft provisional agenda for the forty-fifth 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.
  8. Report to the Committee on the Peaceful Uses of Outer Space.
22. The Working Group of the Whole recommended that the Subcommittee at its forty-fourth session reconvene the Working Group on the Use of Nuclear Power Sources in Outer Space and establish a working group on near-Earth objects to consider, in accordance with the workplan adopted, that item for one year.
23. The Working Group of the Whole also recommended that it be reconvened during the forty-fourth session of the Scientific and Technical Subcommittee.
24. The Working Group of the Whole recalled the agreement to continue the practice of alternating each year the organization of a symposium by the Committee on Space Research (COSPAR) and the International Astronautical Federation (IAF) with a symposium to strengthen the partnership with industry. The Working Group of the Whole agreed that, in 2007, the symposium by COSPAR and IAF would be organized and the industry symposium would be suspended.
25. The Working Group of the Whole recommended that the next symposium organized by COSPAR and IAF, to be held during the forty-fourth session of the Subcommittee, in 2007, should be on the theme "Use of the equatorial orbit for space applications: challenges and opportunities". The Working Group of the Whole agreed that that symposium should be held during the first week of the forty-fourth session of the Subcommittee.

## Annex II

### Report of the Working Group on Space Debris

1. In accordance with paragraph 14 of General Assembly resolution 60/99 of 8 December 2005, the Scientific and Technical Subcommittee, at its forty-third session, reconvened the Working Group on Space Debris to consider the draft space debris mitigation guidelines (A/AC.105/2005/CRP.18) arising from the intersessional meeting of the Working Group held in June 2005. The Working Group held three meetings, on 27 and 28 February and on 1 March 2006.
2. Claudio Portelli (Italy) was elected Chairman of the Working Group on Space Debris at the 648th meeting of the Subcommittee, on 27 February 2006.
3. The Working Group noted that its intersessional meeting held in June 2005 had resulted in the development of the draft space debris mitigation guidelines contained in A/AC.105/2005/CRP.18.
4. The Working Group further noted that informal consultations had been held from 23 to 27 February, during the forty-third session of the Subcommittee, in order to consider and further revise the draft space debris mitigation guidelines, resulting in the revised text contained in A/AC.105/C.1/2006/CRP.19.
5. On 28 February, the Working Group approved the revised draft space debris mitigation guidelines, as amended, and agreed that the revised draft guidelines should be submitted to the Subcommittee for its consideration. The text of the revised draft space debris mitigation guidelines is contained in document A/AC.105/C.1/L.284.
6. The Working Group agreed that it should recommend to the Subcommittee that the revised draft space debris mitigation guidelines (A/AC.105/C.1/L.284) be circulated at the national level to secure consent for approval of the guidelines by the Subcommittee at its forty-fourth session, in 2007.
7. The Working Group agreed that it had successfully met the requirements of the workplan adopted by the Subcommittee at its forty-second session (A/AC.105/848, annex II, para. 6) through the delivery of the draft space debris mitigation guidelines to the Subcommittee.
8. The Working Group noted that the Subcommittee could reconvene the Working Group at any time to consider comments resulting from the referral of the guidelines to the national level, as described in paragraph 6 above, and any further developments, particularly the relationship between the revised draft space debris mitigation guidelines and nuclear power sources in outer space.
9. In that respect, it was also noted that discussions on the matter were ongoing and included the recent presentation on nuclear power sources and space debris made by the Working Group at the Joint United Nations/International Atomic Energy Agency Technical Workshop on the Objectives, Scope and General Attributes of a Potential Technical Safety Standard for Nuclear Power Sources in Outer Space, held in Vienna from 20 to 22 February 2006.
10. At its third meeting, on 1 March 2006, the Working Group adopted the present report.

## Annex III

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

1. At its 644th meeting, on 23 February 2006, 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 24 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 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 overall progress that had been made to date in achieving the objectives of the workplan for the period 2003-2007.
3. The Working Group noted the success of the Joint Technical Workshop on the Objectives, Scope and General Attributes of a Potential Technical Safety Framework for Nuclear Power Sources in Outer Space, which had been organized by the Subcommittee and the International Atomic Energy Agency (IAEA) in Vienna from 20 to 22 February 2006, pursuant to General Assembly resolution 60/99 of 8 December 2005 and the multi-year workplan of the Working Group.
4. It was noted that the papers and presentations delivered at the Workshop (A/AC.105/C.1/2006/NPS/WP.1-10 and A/AC.105/C.1/2006/NPS/CRP.1-14) were available in electronic format on the website of the Office for Outer Space Affairs of the Secretariat ([www.unoosa.org](http://www.unoosa.org)).
5. Following its extensive consideration of the preliminary draft report of the Workshop, contained in a document entitled "Preliminary draft report of the Joint Technical Workshop on the Objectives, Scope and General Attributes of a Potential Technical Safety Framework for Nuclear Power Sources in Outer Space", the Working Group approved the preliminary draft report (see the appendix to the present report).
6. The Working Group recommended that, in accordance with its multi-year workplan, the next intersessional meeting should be held in Vienna from 12 to 14 June 2006, during the forty-ninth session of the Committee on the Peaceful Uses of Outer Space.
7. The Working Group requested the Secretariat to distribute the preliminary draft report of the Workshop to IAEA and member States of the Committee, for their review and comment, so that it could be considered by the Working Group at its next intersessional meeting, in June 2006.
8. The Working Group agreed that the preliminary draft report of the Workshop, as well as comments to be received from IAEA and member States of the Committee, would serve as the basis for an updated report of the Workshop, which



would be submitted to the Secretariat, for subsequent distribution to the member States of the Committee.

9. The Working Group agreed that, in accordance with the conclusions contained in the preliminary draft report of the Workshop, the secretariat of the Committee should prepare and submit to IAEA a letter containing a number of questions identified at the Workshop that were contained in the preliminary draft report. The letter would request IAEA to submit the replies to the questions by 14 April 2006, so that the secretariat of the Committee would be able to have the replies translated and distributed three weeks prior to the intersessional meeting of the Working Group to be held in June 2006.

10. The Working Group recommended that, for the purpose of consistency, it would refer in the future to document A/AC.105/L.253/Rev.2 for the definition of “the international technically based framework of goals and recommendations for the safety of planned and currently foreseeable nuclear power source applications in outer space”.

11. At its 5th meeting, on 1 March, the Working Group adopted the present report.

## Appendix

### **Preliminary draft report of the Joint Technical Workshop on the Objectives, Scope and General Attributes of a Potential Technical Safety Framework for Nuclear Power Sources in Outer Space, held in Vienna from 20 to 22 February 2006**

#### **I. Background**

1. Over the years, formal and informal discussions within the Working Group on the Use of Nuclear Power Sources in Outer Space of the Scientific and Technical Subcommittee and between the Working Group and representatives of the International Atomic Energy Agency (IAEA) led to the conclusion that further work on any of the potential options for cooperating with IAEA in developing a technical safety framework for nuclear power sources (NPS) in outer space would be assisted significantly by holding a joint workshop. The Joint Technical Workshop on the Objectives, Scope and General Attributes of a Potential Technical Safety Framework for Nuclear Power Sources in Outer Space, organized by the Subcommittee and IAEA in Vienna from 20 to 22 February, facilitated an exchange of views on the subject between the Working Group and IAEA. The exchange improved mutual understanding of the respective roles and working methods of IAEA and the Subcommittee and assisted in examining the main questions that would arise in cooperating to develop an international safety framework for nuclear power sources in outer space.

2. The main objectives of the Workshop were:

(a) To enhance the proposed outline of objectives, scope and attributes for an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable NPS applications in outer space;

(b) To enhance the definition of potential implementation options for establishing an international technically based framework of goals and recommendations for the safety of planned and currently foreseeable NPS applications in outer space.

#### **II. Observations**

3. The Workshop provided useful information pertinent to the current multi-year workplan of the Subcommittee and its Working Group on Nuclear Power Sources in Outer Space. The Workshop provided a forum for sharing: views and information between national, regional and international agencies, participating member States and IAEA; the latest information on ongoing, planned and currently foreseeable NPS applications in space; the unique design considerations for NPS applications in space; information on NPS in relation to space debris; the scope, attributes and objectives of a space NPS safety framework, most notably the minimum essential elements of such a framework from the perspective of both radioisotope and reactor applications; and observations and questions relevant to the two options under consideration by the Working Group for implementing a space NPS safety framework.

**A. Planned and currently foreseeable NPS applications in space**

4. The Workshop participants made the following observations on planned and currently foreseeable NPS applications in space:

(a) According to current knowledge and capabilities, nuclear power sources are the only available energy option to power some space missions and significantly enhance others. Some ongoing and foreseeable missions would not be possible without the use of NPS;

(b) Space nuclear power sources have been in use for more than four decades. Fission reactors have not been flown for several years and no specific plans exist for using them in the near future. However, space reactors are expected to be needed for scientific and exploration missions, specifically for the Moon and Mars. Earth orbital missions requiring high power (e.g. communications, inter-orbital space tugs) are also foreseeable;

(c) Radioisotope power systems (including radioisotope heater units) are currently in use and their continued use is planned;

(d) Missions to Mars are planned by national, regional and international space agencies that might use space radioisotope power sources (including radioisotope heater units);

(e) The environments for space NPS applications (from launch through operation to retirement) are radically different from the environment for terrestrial applications;

(f) Space reactors are very different from terrestrial reactors in design and operation. The specific environments (both operating and potential accident conditions) create very different safety design and operation criteria;

(g) Space mission requirements lead to unique mission-specific designs for space NPS, launch systems and mission operations.

**B. Objectives, scope and attributes of a space NPS safety framework**

5. The deliberations of the Workshop were based on the document entitled "Outline of objectives, scope and attributes for 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/L.253/Rev.2). Observations included the following:

(a) Several reasons were expressed by Workshop participants for having an international safety framework for space NPS. These included: the necessity of having common safety criteria for space NPS missions; providing assurance that space NPS safety was being addressed appropriately; and providing a common basis for cooperative international space missions using NPS;

(b) It was noted that the current Subcommittee document on the outline (A/AC.105/L.253/Rev.2) generally described the consensus view of the type of safety framework envisioned by the Workshop participants. However it was very general and would need to be made more specific to form the basis for a

collaborative development of a safety framework between the Committee on the Peaceful Uses of Outer Space and IAEA;

(c) The view was expressed that such a framework could provide a basis for future, possibly binding agreements;

(d) The Workshop participants identified common elements deemed essential to an effective safety framework: the framework should be internationally accepted, provide high-level guidance and address both radioisotope power systems (RPS) and reactor systems. It should further promote the establishment or use of national safety processes that are credible, reliable and transparent. Such national processes should include both technical and programmatic elements to mitigate risks arising from the use of NPS through all relevant phases of a mission.

### **C. Implementation options for a space NPS safety framework**

6. The Workshop participants received an overview of the two implementation options being considered by the Working Group for establishing a space NPS safety framework: option 1, a cooperative Subcommittee/IAEA safety framework development; and option 3, a multilateral safety framework development involving interested national, regional and international agencies followed by a review conducted by the Committee with various levels of IAEA involvement. In addition, a summary was presented of the key issues in coordinating the processes of the Committee and IAEA for implementing the two options. During the Workshop, several observations, comments and questions emerged, some general to both options and some specific to either option 1 or option 3:

#### **(a) General observations and comments:**

(i) Comprehensive space NPS safety frameworks exist and are in use in two member States. Some member States have been cooperating recently to develop a plan for a regional space NPS safety framework;

(ii) Terrestrial aspects of space NPS activities fall within the scope of existing IAEA safety standards;

(iii) IAEA is in the process of combining three existing IAEA Safety Fundamentals documents into one. These IAEA Safety Fundamentals are intended to form the foundation for all other documents in the Safety Standards Series, including in the categories Safety Requirements and Safety Guides;

(iv) The currently consolidated IAEA draft Safety Fundamentals are not written with space NPS applications in mind. The degree of their potential relevance to developing an international space NPS safety framework would need to be studied;

(v) For all current IAEA safety standards, the Agency has the expertise (either within IAEA or by engaging technical consultants) and resources to provide for the implementation of such standards, including peer reviews, education and training;

(vi) IAEA currently does not have space NPS expertise. In the event it were to participate in the development of a space NPS safety framework, the

Agency would need to engage space expertise from those with space NPS experience within the space community, including the Working Group;

(vii) If IAEA were to co-sponsor a space NPS safety framework, then the Agency and the Committee would need to agree on arrangements for maintaining expertise and providing for the implementation of the framework;

(viii) The list of implementation options may be incomplete;

**(b) Comments and questions pertinent to option 1:**

Option 1 of the possible collaborative approaches considered by the Working Group (A/AC.105/L.254/Rev.2) requires the Subcommittee and IAEA to coordinate their respective document development processes with the objective of co-sponsoring a safety framework for space NPS. During the discussions, the Workshop participants identified the potential advantages of this option and several questions that would need to be addressed before such an option could be implemented. General observations and comments included the following:

(i) Publication of an international space NPS safety framework co-sponsored by IAEA and the Committee would benefit from the international standing and technical competence of both organizations. Such a safety framework would likely be widely recognized and help in the development of national safety frameworks (including standards) for space missions involving NPS;

(ii) The safety standard development process established by IAEA is recognized as providing an effective mechanism for achieving technically sound safety standards that reflect an international consensus;

(iii) Several questions pertinent to option 1 require further elucidation, including: the coordination of the work and decision processes of IAEA and the Committee; the language or languages used for conducting a collaborative framework development; the funding sources for supporting the development of a safety framework (interpretation and translation services, publication, meetings etc.); and the organization and management of the work programme for developing a safety framework;

**(c) Comments and questions pertinent to option 3:**

Option 3 involves three alternative approaches for the participation of IAEA with the Subcommittee in reviewing a safety framework developed by a multilateral group of agencies and experts. In the first approach, the Committee asks IAEA to conduct a technical assessment of the framework to assist the Subcommittee in its consideration of the framework. In the second approach, IAEA (making use, as appropriate, of its review and approval processes) cooperates with the Subcommittee in conducting a technical assessment of the framework. In the third approach, a technical representative of IAEA first assists the multilateral group's development of a space NPS safety framework and then supports the Subcommittee in the review of the framework. Several comments and questions concerning option 3 were raised in the Workshop discussions, some relating to option 3 in general and others relevant only to specific variants of the option:

(i) For all variants of option 3, IAEA has no mechanism for endorsing, publishing or supporting any space NPS safety framework developed outside

the Agency's existing safety standard development process. However, IAEA participation in any of the variants of option 3 could be noted in an introductory paragraph accompanying either the assessment of a multilateral space NPS safety framework (i.e. option 3A or 3B) or the actual development and review of such a framework (i.e. option 3C);

(ii) The safety standard development process established by the IAEA could serve as an effective model for use by a multilateral group of national, regional and international agencies and experts on how to achieve a consensual technically sound space NPS safety framework, but the IAEA structure and mechanisms would not be available for this process;

(iii) IAEA participation in any of the variants of option 3 could help ensure that potential conflicts between a multilaterally developed space NPS safety framework and existing terrestrial nuclear safety standards were identified, avoided and/or adequately explained;

(iv) Several questions pertinent to option 3 require further elucidation, including: the language or languages used for conducting a multilateral framework development; and the funding sources for supporting the development of a safety framework (interpretation and translation services, publication, meetings etc.). In addition, for option 3B, further questions involve the coordination of the work and decision processes of IAEA and the Committee and the organization and management of the work programme;

**(d) Questions to be addressed to IAEA:**

(i) Are there any restrictions within the IAEA statute or prior determinations by the Board of Governors that could prevent the Agency from acting in collaboration with the Committee in the common development and support of a safety framework for space NPS? If there are no such restrictions, what would be the proper procedure for the Committee to request such an activity by IAEA?

(ii) Other than the collaboration referred to in subparagraph (d) (i) above, what form of consultancy and/or review support would IAEA be prepared to provide to the Committee or a multilateral group of national, regional and international agencies and experts in the development of a safety framework for space NPS?

(iii) Recognizing that IAEA has not formulated safety standards for space NPS and that specific aspects of an international space NPS safety framework could differ from generally accepted terrestrial practices (e.g. the use of highly enriched fuel in space reactors), would the Agency be prepared to make the necessary policy decisions, resource allocations, possible adjustments to the terms of reference for its safety standards committees and/or related actions to cooperate with the Committee or the multilateral group (as mentioned in subpara. (d) (ii) above) in preparation of a space NPS safety framework? What would be realistic time frames for such actions?

### III. Conclusions

7. The Joint Technical Workshop on the Objectives, Scope and General Attributes of a Potential Technical Safety Framework for Nuclear Power Sources in Outer Space was successful in detailing the scope, attributes and objectives, as well as the implementation options, of a potential international safety framework for the use of nuclear power sources in outer space. The Workshop greatly benefited from the active participation of and presentations made by representatives of IAEA and the Committee.
  8. The Workshop confirmed and emphasized the need for nuclear power sources for several types of space missions and the potential benefit of an international safety framework for the use of nuclear power sources in space applications.
  9. The Workshop highlighted the special environment for space nuclear power sources and the resulting different safety requirements for space and terrestrial nuclear power source applications.
  10. The Workshop helped to better understand respective mechanisms of the development and decision processes of IAEA and the Committee and characterized advantages, drawbacks and peculiarities of the different implementation options.
  11. In detailing the scope, attributes and objectives, as well as the implementation options, of such a framework, the Workshop participants identified those questions for IAEA which would be important to address prior to the Working Group's recommendation of a specific implementation option in 2007. It is recommended that those questions be submitted to the Agency for clarification prior to the intersessional meeting of the Working Group in June 2006.
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