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Committee on the Peaceful Uses of Outer Space

Report of the Expert on Space Applications*

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* It was necessary to summarize in the present report each of the activities organized during 2010 under the United Nations Programme on Space Applications, the last of which was concluded on 2 December 2010.



I. Introduction

1. At its forty-seventh session, in 2010, the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space reviewed the activities of the United Nations Programme on Space Applications. The Subcommittee noted that the activities of the Programme for 2009 had been carried out satisfactorily. On the recommendation of the Committee, the activities of the Programme for 2011 were endorsed by the General Assembly in its resolution 65/97. The Subcommittee recommended to the Committee, for its approval, the activities scheduled for 2011 and noted the other activities of the Programme. All of the activities were to be implemented as part of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) related to space applications,¹ as proposed in the report of the Expert on Space Applications (A/AC.105/969) submitted to the Scientific and Technical Subcommittee at its forty-seventh session, in 2010. Information on the activities carried out within the framework of the Programme in 2010 and those scheduled for implementation in 2011 are presented in annexes I and II.

II. Mandate of the United Nations Programme on Space Applications

2. In its resolution 37/90, the General Assembly expanded the mandate of the United Nations Programme on Space Applications to include, in particular, the following elements:

(a) Promotion of greater exchange of actual experiences with specific applications;

(b) Promotion of greater cooperation in space science and technology between developed and developing countries as well as among developing countries;

(c) Development of a fellowship programme for in-depth training of space technologists and applications specialists;

(d) Organization of seminars on advanced space applications and new system developments for managers and leaders of space application and technology development activities, as well as seminars for users in specific applications;

(e) Stimulation of the growth of indigenous nuclei and an autonomous technological base with the cooperation of other United Nations organizations and/or States Members of the United Nations or members of the specialized agencies;

(f) Dissemination of information on new and advanced technology and applications;

¹ See *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).

(g) Provision or arrangements for provision of technical advisory services on space applications projects, upon request by Member States or any of the specialized agencies.

3. In its resolution 59/2, the General Assembly endorsed the Plan of Action proposed by the Committee on the Peaceful Uses of Outer Space for implementation of the recommendations of UNISPACE III (A/59/174, sect. VI.B), and urged all Governments, entities of the United Nations system and intergovernmental and non-governmental entities conducting space-related activities to carry out the Plan of Action on a priority basis for the further implementation of the recommendations of UNISPACE III, in particular its resolution entitled “The Space Millennium: Vienna Declaration on Space and Human Development”.²

III. Orientation of the Programme

4. The Programme is aimed at further promoting, through international cooperation, the use of space technologies and data for sustainable economic and social development in developing countries by raising the awareness of decision makers of the cost-effectiveness and additional benefits to be obtained; establishing or strengthening capacity in developing countries to use space technology; and strengthening outreach activities to disseminate awareness of the benefits obtained.

5. The overall strategy of the Programme is to focus on selected areas that are critical for developing countries, defining and working towards objectives achievable in two to five years and built on the results of previous activities. These priority areas of the Programme, as noted by the Committee on the Peaceful Uses of Outer Space at its forty-seventh session³ are: (a) disaster management; (b) satellite communications for tele-education and telemedicine applications; (c) monitoring and protection of the environment, including the prevention of infectious diseases; (d) management of natural resources; (e) developing capabilities in the use of global navigation and positioning satellite systems; (f) education and capacity-building, including research areas in basic space sciences; and (g) space law.

6. Additional Programme directions include spin-offs of space technology, promoting the participation of youth in space activities, capacity-building in basic space technology development such as small satellite applications and human space technology utilizing the International Space Station, and promoting the participation of private industry in the activities of the Programme.

7. At its forty-fourth session, in 2001, the Committee identified the recommendations of UNISPACE III that had the highest priority, noting that offers had been made by interested member States to exercise leadership in implementing some of those recommendations. The Committee agreed to establish action teams to implement those recommendations under the voluntary leadership of interested

² Ibid., chap. I, resolution 1.

³ *Official Records of the General Assembly, Fifty-ninth Session, Supplement No. 20 and corrigenda (A/59/20 and Corr.1 and 2)*, para. 66.

member States.⁴ Programme activities have supported those action teams as much as possible.

8. The Programme is implemented by:

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

(b) Organizing workshops and seminars on advanced space applications and space technology, as well as on short and medium-term training programmes;

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

(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 advisory services, 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.

IV. Activities of the Programme

A. Training for capacity-building in developing countries

1. Regional centres for space science and technology education, affiliated to the United Nations

9. In its resolution 64/86, the General Assembly noted with appreciation that the African regional centres for space science and technology education, in French language and English language, located in Morocco and Nigeria, respectively, as well as the centre for space science and technology education in Asia and the Pacific and the regional centre for space science and technology education for Latin America and the Caribbean, affiliated to the United Nations, had continued their educational programmes in 2010. The Assembly agreed that the regional centres should continue to report to the Committee on their activities on an annual basis.

10. The Assembly also welcomed the fact that the regional centres serve as information centres of the International Committee on Global Navigation Satellite Systems (ICG). In order to introduce the regional centres to information dissemination in the field of global navigation satellite systems (GNSS) and begin the development of an educational curriculum on GNSS, training courses on satellite navigation and location-based services co-organized and co-sponsored by ICG have been held at all regional centres: in India in 2008, in Morocco in 2009, in Mexico in 2009 and in Nigeria in 2010.

11. The governing boards, which are the overall policymaking bodies, of all the regional centres are holding regular meetings.

⁴ Ibid., *Fifty-sixth Session, Supplement No. 20* and corrigendum (A/56/20 and Corr.1), paras. 50-55.

12. The Programme has invited all the regional centres to submit reports on their educational activities and operational status and on recent developments in their work. Reports and presentations on the activities of the regional centres are available on the website of the Office for Outer Space Affairs of the Secretariat (www.unoosa.org/oosa/en/SAP/centres/index.html). A summary of those reports is contained in *Capacity-Building in Space Science and Technology: Regional Centres for Space Science and Technology Education, Affiliated to the United Nations* (ST/SPACE/41). Based on those reports and supplementary material provided by the regional centres, the Programme carries out annual global outreach campaigns to raise the awareness of Member States, United Nations Development Programme offices and other entities involved in space-related issues on the activities of the centres.

13. The African regional centres for space science and technology education, in the French language and the English language, located in Morocco (www.enssup.gov.ma/craste) and Nigeria (www.arcsstee.org), respectively, as well as the centre for space science and technology education in Asia and the Pacific, located in India (www.cssteap.org), and the regional centre for space science and technology education for Latin America and the Caribbean, located in Brazil (www.inpe.br/unidades/cep/atividadescep/crectalc) and Mexico (www.crectalc.org), affiliated to the United Nations, have developed and maintain information portals on the Internet through which they display in detail their activities.

14. The overall goal of the regional centres remains to develop, through in-depth education, an indigenous capability for research and applications in remote sensing and geographic information systems, satellite meteorology and global climate, satellite communications, and space and atmospheric science. Education curricula for those four disciplines have been developed through expert meetings held under the Programme. Two further model curricula are currently being developed under the auspices of the United Nations in the area of GNSS and space law.

15. Highlights of the activities of all regional centres supported under the Programme are included in annex III.

16. At its fifth meeting, held in Turin, Italy, from 18 to 22 October 2010, ICG developed the concept that the regional centres would act as ICG information centres.

17. The Programme is preparing to hold the fourth United Nations expert meeting on the regional centres for space science and technology education. At that meeting, efforts will be made to develop existing and forthcoming educational curricula. The regional centre for space science and technology education in Asia and the Pacific has made revisions to the four existing educational curricula for consideration in an expert meeting.

18. The centre for space science and technology education in Asia and the Pacific has prepared a comprehensive document entitled “CSSTEAP Performance Assessment and Outlook for the Future”, which has been made available to all regional centres for space science and technology education, affiliated to the United Nations, to the Committee and its subsidiary bodies, and to space-related entities worldwide. For the first time since it was inaugurated, the regional centre in Asia and the Pacific analysed in detail, through the document, its achievements, looking

in particular at how long-term training courses were being conducted, and evaluated its performance in terms of meeting the goals of the United Nations. In the document, the centre took into account the feedback received from a large number of alumni and provided a vision for how Asia and the Pacific could better utilize the regional centre.

2. Fellowship programmes for training

19. In 2004, the Government of Italy, through the Politecnico di Torino and the Istituto Superiore Mario Boella and with the collaboration of the Istituto Elettrotecnico Nazionale Galileo Ferraris, initiated an offer of 12-month fellowships for postgraduate study on GNSS and related applications for specialists from developing countries. The seventh class of the fellowship programme commenced in September 2010. Four representatives of governmental organizations and research and academic institutions from China, Pakistan, the Philippines, and Rwanda were jointly selected by the Office for Outer Space Affairs and the sponsoring organizations for fellowships to study at the Politecnico di Torino in Turin, Italy.

20. The Office for Outer Space Affairs and the Government of Japan have taken the first steps towards the establishment of a joint United Nations-Japan long-term fellowship programme on nano-satellite technologies in cooperation with Kyushu Institute of Technology. Details on the programme and the application procedures will be made available on the website of the Office for Outer Space Affairs. The first students to be selected are expected to begin their work at the Institute in October 2011.

B. Space science, space technology and their applications

1. Natural resources management and environmental monitoring

21. The United Nations/Turkey/European Space Agency Workshop on Space Technology Applications for Socio-Economic Benefits was held in Istanbul, Turkey, from 14 to 17 September 2010 (A/AC.105/986). The Workshop was hosted by the Scientific and Technological Research Council of Turkey on behalf of the Government of Turkey and co-sponsored by the European Space Agency (ESA). The objective of the Workshop was to increase the awareness of the socio-economic benefits of applying space technology at the national, regional and international levels, focusing on satellite remote sensing, satellite communications, GNSS, capacity-building and regional and international cooperation.

22. In six plenary sessions presentations were given on the following: (a) capacity-building in space technology; (b) remote sensing applied to urban climate, air quality and transportation; regional climate, water resources and agricultural productivity; and sustainable global development: data, models and the role of public-private sector partnerships; (c) remote sensing applications on disaster management; (d) GNSS applications and satellite communications; (e) recent developments in space science and technology; and (f) regional and international cooperation. The Workshop provided an opportunity for scientists and engineers from different countries who are engaged in finding ways to use space technology to benefit their communities to share their experiences and to explore opportunities for collaborative research and the study of applications. Observations made through

remote sensing from satellite and airborne platforms can provide information required by modelling systems for regulatory planning. The use of such remotely sensed observations and computer models can substantially enhance the ability of communities and States to embark on a more sustainable path to economic development, substantially reducing the cost associated with inadequate planning. In the concluding session of the Workshop, the participants proposed the establishment of a number of working groups to facilitate the identification of specific application approaches and studies across regions to demonstrate that integrating space science and technology can support decision-making for the benefit of society.

23. The United Nations/Plurinational State of Bolivia/European Space Agency Workshop on Integrated Space Technology Applications in the Mountain Regions of the Andean Countries (A/AC.105/997) was held in Cochabamba, Plurinational State of Bolivia, from 25 to 29 October 2010. To date, the Programme and host countries have organized five workshops on space technology applications in mountain regions, three of which in the Andean region, with the participation of 53 regional entities.

24. The main objectives of the Workshop held in Cochabamba were: (a) to consolidate and advance a multifaceted project on satellite information for sustainable development in the mountain areas of Andean countries involving agriculture, hydrology, geology, mineralogy and the environment (the Andessat initiative); (b) to train participants in the interpretation of radar/optical satellite imagery; and (c) to develop case studies within the framework of the “Andes in space” project. The Workshop was co-sponsored by ESA. More than 100 scientists, educators, decision makers and engineers from the Andean countries and international organizations participated in the above-mentioned activities. The National Commission on Space Activities of Argentina (CONAE) exhibited a future satellite mock-up, which is currently being tested, to address problems being studied within the framework of the Andessat initiative.

25. The following represented major outcomes of the Workshop: (a) the Andessat initiative was recognized as an important mechanism for coordinating satellite technology applications for the sustainable development of mountain regions, and it was recommended that the Andessat initiative be strengthened for the management of regional projects of common interest to Andean countries; (b) it was decided that CONAE would act as a coordinating agency in monitoring Andean glaciers in cooperation with the ESA Climate Change Initiative; (c) training sessions were held to improve participants’ ability to process data from a range of different satellite sensors (radar/optical) using ESA software toolboxes; and (d) the training of 20 high school teachers in the framework of Eduspace sessions resulted in the presentation of most of the 10 case studies initiated during the United Nations/Peru/Switzerland/European Space Agency Workshop on Integrated Space Technology Applications for Sustainable Development in the Mountain Regions of Andean Countries, held in Lima from 14 to 18 September 2009 (A/AC.105/968); the case studies will be translated into nine languages and be made available online on the Eduspace pages of the ESA website (www.eduspace.esa.int); (e) the Workshop participants requested the Pro Tempore Secretariat of the Fifth Conference of the Americas to propose that the Programme continue supporting the workshops on space technology applications for the sustainable development of the Andean countries.

2. Enabling space technologies

26. The United Nations/Republic of Moldova/United States of America Workshop on Applications of Global Navigation Satellite Systems, which was hosted by the Agency for Land Relations and Cadastre on behalf of the Government of the Republic of Moldova, was held in Chisinau from 17 to 21 May 2010 (A/AC.105/974). The Workshop was co-sponsored by the United States through ICG. The objectives of the Workshop were to do the following: (a) increase the awareness of national and regional users of the growth of GNSS applications; (b) address ways and means that would contribute to the wider use of GNSS technology and its applications; and (c) consider the possibility for interested institutions to incorporate the use of GNSS technologies into one or more national and/or regional pilot projects.

27. The Workshop participants established three working groups, each focusing on one of the following topics: capacity-building and institutional strengthening, a geodetic reference network, and GNSS applications. In the framework of ongoing projects and programmes of relevance to the region, it was recommended that a group of educators and experts on GNSS be established to assess the short-term training courses on satellite navigation and location-based services held by the regional centres for space science and technology education, affiliated to the United Nations, in India in 2008 (A/AC.105/922, paras. 13-16), in Mexico and Morocco in 2009 (A/AC.105/950, para. 6) and in Nigeria in 2010. The deployment of low-cost space weather monitors could be a means of complementing data analysis and applications. Recognizing the present status of GNSS and the prospects for the continued development of a wide variety of applications critical to science, commerce and infrastructure, participants highlighted the need to continue holding workshops on GNSS. Collaboration between countries in the region and reference station networks such as the European Position Determination System (EUPOS) and the Reference Frame Sub-Commission for Europe (EUREF) was encouraged. It was noted that cooperation between ICG and regional reference systems, sometimes facilitated by the regional centres for space science and technology education, affiliated to the United Nations, could provide a springboard for the transfer and enhancement of skills and knowledge in surveying, geodesy and GNSS, including its applications, taking into account the unique conditions present in each region and the need for tailored approaches.

28. The second in a series of three United Nations/Austria/European Space Agency symposiums on small satellite programmes for sustainable development was held in Graz, Austria, from 21 to 24 September 2010 (A/AC.105/983). The Symposium was co-sponsored by the Federal Ministry for European and International Affairs of Austria, the State of Styria, the City of Graz and ESA. The series of symposiums is part of the United Nations Basic Space Technology Initiative (BSTI), a new initiative in the framework of the United Nations Programme on Space Applications that aims to support capacity-building in basic space technology and promote the use of space technology and its applications for sustainable development.

29. At the Symposium, participants focused on the theme "Payloads for small satellite programmes". They reviewed the status of small satellite activities worldwide, paying particular attention to regional cooperation; examined the potential of applying nano- and small satellites to education, research and

operations; discussed technical and programmatic issues related to developing payloads; and considered regulatory issues specific to nano- and small satellite programmes, such as frequency allocations, space debris mitigation and registration. Participants in the Symposium recognized the opportunities for establishing indigenous space technology development capabilities provided by recent technical advances and by the comparatively low cost of entering the field of nano- and small satellite development. They encouraged stronger regional and international cooperation among institutions involved in nano- and small satellites and approved the BSTI work programme.

30. The third and final symposium in the series of United Nations/Austria/ESA symposiums, to be held in 2011, will focus on programmatic, regulatory and legal issues of nano- and small satellite activities. Several of the institutions represented at the 2010 Symposium expressed interest in hosting a regional workshop on basic space technology development in the period 2012-2014. The recommendations and observations made at the Symposium are contained in document A/AC.105/983.

31. The United Nations/International Astronautical Federation Workshop on Global Navigation Satellite Systems Applications for Human Benefit and Development was held in Prague on 24 and 25 September 2010 (A/AC.105/984), in conjunction with the 61st International Astronautical Congress. At the Workshop, participants discussed GNSS technologies, applications and services that contribute to sustainable economic and social development programmes, primarily in developing countries. They also discussed opportunities for increasing regional and international cooperation in that area.

32. Major issues and themes identified in the presentations delivered at three technical sessions were summarized by working groups and further discussed by the round table, which benefitted from the participation of leading managers of space agencies and other relevant institutions from both developing and industrialized countries, as well as of international organizations.

33. Among the key conclusions reached in the discussions were the following: increased efforts were needed to bring GNSS to end-users by developing and making available turnkey operations that bridge the gap between GNSS providers and end-users and by developing and delivering training programmes; a long-term investment environment needed to be established and GNSS technologies that would bring the greatest immediate benefit to society needed to be identified and developed, for example in such areas as the provision of food and potable water, and disaster management; and the standardization of GNSS reference documents should be addressed by ICG in the future. The participants in the Workshop emphasized that awareness-raising activities should be continued through workshops and training courses focusing on specific areas of interest to end-users.

34. The Eleventh United Nations/International Academy of Astronautics Workshop on Small Satellites in the Service of Developing Countries was held in Prague on 28 September 2010 (A/AC.105/995) within the framework of the 61st International Astronautical Congress. The main objectives of the Workshop were the following: (a) to review the benefits of small satellite programmes for developing countries; (b) to demonstrate the effectiveness, including in terms of costs, of small satellites; and (c) to encourage educational and training activities at universities in developing countries.

35. The half-day Workshop was organized as an integral part of the Congress and was attended by about 100 Congress participants. The Workshop featured 13 technical presentations, most of which focused on the contribution that small satellites could make to scientific, Earth observation and telecommunication missions; emphasis was placed on the importance of international cooperation, education, training and the benefits of small satellite programmes to developing countries.

3. Space science and space law

36. At its fifty-second session, in 2009, the Committee on the Peaceful Uses of Outer Space noted the importance of continuing to build upon the success of the International Heliophysical Year 2007, in particular by deepening the understanding of the function of the Sun and its effects on the Earth's magnetosphere, environment and climate, and noted with satisfaction the agreement reached by the Scientific and Technical Subcommittee at its forty-sixth session to consider, beginning at its forty-seventh session, a new agenda item entitled "International Space Weather Initiative" under a three-year workplan (2010-2012) with specific focus on the effects of space weather on the Earth.⁵ The Initiative will utilize the ground-based instrument arrays that have been deployed since 2005.

37. Workshops in the framework of the International Space Weather Initiative are tentatively scheduled to be hosted by Egypt for Western Asia (2010), Nigeria for Africa (2011) and Ecuador for Latin America and the Caribbean (2012). Initial important elements of the Initiative are the development and maintenance of a website (www.iswi-secretariat.org), by Bulgaria, and a newsletter, by Japan, throughout the period 2010-2012 to ensure worldwide delivery and development of results of the Initiative and its space weather instrument arrays. From the beginning, all 192 Member States of the United Nations will participate in the effort.

38. The first United Nations/National Aeronautics and Space Administration/Japan Aerospace Exploration Agency Workshop on the International Space Weather Initiative was held from 6 to 10 November 2010 at Helwan University in Cairo. The Workshop was co-organized and co-sponsored by Kyushu University of Japan and ICG. Local organization and sponsorship was provided by the Ministry of Higher Education of Egypt and Helwan University, specifically through its Space Weather Monitoring Centre.

39. More than 120 scientists, engineers and policymakers from 30 countries attended the Workshop to discuss the fact that the variability of the sun affected the Earth adversely. Recognizing that society was becoming increasingly dependent on space-based systems, participants agreed that it was vital to understand how space weather, which is caused by solar variability, affects, among other things, space systems and human space flight, electric power transmissions, high-frequency radio communications, GNSS signals and long-range radar, and the well-being of passengers in high-altitude aircraft. Through the International Space Weather Initiative, efforts are being made to utilize fully and expand as fast as feasible the availability of the ground-based instrument arrays that have been deployed during the five years of the International Heliophysical Year 2007 campaign for the purpose

⁵ *Ibid.*, *Sixty-fourth Session, Supplement No. 20 (A/64/20)*, para. 155.

of monitoring the impact of solar variability on the Earth. At the Workshop, in-depth presentations were given of the results of space weather instrument arrays such as the Scintillation Network Decision Aid (SCINDA), the Coherent Ionospheric Doppler Radar (CIDR), the Atmospheric Weather Electromagnetic System of Observation, Modeling and Education (AWESOME), the Sudden Ionospheric Disturbances (SID) monitor, the Remote Equatorial Nighttime Observatory for Ionospheric Regions (RENOIR), the Compound Astronomical Low-cost Low-frequency Instrument for Spectroscopy and Transportable Observatory (CALLISTO), the Magnetic Data Acquisition System (MAGDAS), the African dual frequency GPS network (GPS-Africa), the African GPS Receivers for Equatorial Electrodynamics Studies (AGREES), the African Meridian B-Field Education and Research (AMBER), the South Atlantic Very Low-Frequency Network (SAVNET), the Space Environmental Viewing and Analysis Network (SEVAN), Global Muon Detector Network (GMDN), the Continuous H-alpha Imaging Network (CHAIN) and the Optical Mesosphere Thermosphere Imagers (OMTI). These instrument arrays have been deployed to countries in Africa and along the equator. Close to 1,000 space weather instruments were operational and were recording data by utilizing GNSS receivers, magnetometers, very-low-frequency recorders, solar particle detectors and spectrometers.

40. The main results of the workshops concerned the future expansion of all instrument arrays, data recording techniques and data analysis and image processing methods, coordination and collaboration among arrays and array members, and the utilization of data and images for research and in other applications.

41. The United Nations/Thailand Workshop on Space Law was held in Bangkok from 16 to 19 November 2010 (A/AC.105/989). The Workshop was the seventh in a series of space law workshops organized by the Office for Outer Space Affairs together with host countries. The Workshop was co-organized by the Office for Outer Space Affairs, the Geo-Informatics and Space Technology Development Agency (GISTDA) of Thailand, ESA and the Asia Pacific Space Cooperation Organization (APSCO). The objectives of the Workshop were to promote understanding, acceptance and implementation of the United Nations treaties and principles concerning outer space; to promote the exchange of information on national space legislation and policies for the benefit of professionals involved in national space activities; and to consider mechanisms for regional cooperation in the peaceful uses of outer space.

42. The Workshop resulted in a set of recommendations, observations and conclusions addressing the implementation and application of the United Nations treaties at the national level, in particular with regard to national space legislation and national regulatory and policy frameworks, and the role of regional cooperation mechanisms in supporting efforts to promote education in space law and foster educational programmes within Asia and the Pacific. The Workshop participants made detailed observations on the following elements that could be considered by States in enacting national space legislation: (a) scope of application; (b) authorization and licensing of national space activities; (c) supervision and control; (d) registration; (e) liability and insurance; (f) safety of space activities and protection of the space and Earth environment; and (g) transfer of ownership or control of space objects in orbit. The workshop acknowledged the contributions

made by APSCO, the Asia-Pacific Regional Space Agency Forum (APRSAF) and other regional mechanisms to build capacity in space law and space technology.

C. Technical advisory services and regional cooperation

43. At the request of the Seventh Research and Development Framework Programme of the European Union's Global Monitoring for Environment and Security (GMES) Network of Users project, the Office for Outer Space Affairs, as a member of the GMES Network of Users International Stakeholders Group, provided advisory services at the project's second meeting, held in London on 17 September 2010.

44. At the request of the Lithuanian Space Association, the Programme presented BSTI and regulatory aspects of satellite registration at the first international space conference in Lithuania, held in Vilnius from 6 to 9 October 2010 on the theme "Space Economy in the Multipolar World".

45. At the request of the International Astronautical Federation, the Programme presented BSTI at the "Cluster forum — nanosatellite event" in the framework of the 61st International Astronautical Congress, held in Prague on 29 September 2010.

46. At the request of Caneus International, the Programme presented, by videoconference, BSTI and other relevant services of the Office for Outer Space Affairs at the Caneus Shared Small Satellites Collective Security, Safety and Prosperity International Workshop, held in Marina di Carrara, Italy, on 20 October 2010.

47. At the request of the Government of Mexico, the Programme provided support to the working group on space technology at the Sixth Space Conference of the Americas, held in Pachuca, Mexico, from 15 to 19 November 2010. The workplan of BSTI was presented at the Conference.

48. The Programme provided the necessary advisory assistance and financial support to the International Academy of Astronautics and the National Space Research and Development Agency of Nigeria for organizing an international symposium entitled "Equatorial Plane: Attributes and Characteristics", held from 30 November to 2 December 2010 in Abuja.

49. In the framework of BSTI, the Programme published *Educational Opportunities in Aerospace Engineering and Small Satellite Development* (ST/SPACE/53), which contains information on academic programmes in aerospace engineering and small satellite development open to international students. The publication is available from the website of the Office for Outer Space Affairs (www.unoosa.org/oosa/en/SAP/bsti/bsti-education/index.html).

50. The Asia-Pacific Satellite Communications Council (APSCC) held its 13th Annual Asia-Pacific Satellite Communications, Broadcasting and Space Conference and Exhibition under the theme "Beyond survival, it is responsibility" in Tokyo from 5 to 7 October 2010. The Conference was attended by more than 400 professionals and leaders from the satellite industry, governments and non-governmental organizations, including satellite operators, satellite manufacturers, launch vehicle service providers, risk management and financing

professionals, equipment manufacturers, satellite service providers, government regulators, users and academics. The Conference highlighted critical issues affecting the satellite industry in the Asia-Pacific region, including new satellite application technologies, services strategies and regulatory issues currently faced by the satellite community, through round tables, panel discussions and sessions. The APSCC annual conferences are Asia's largest satellite-related events for senior-level operators in the satellite industry.

51. The panel on satellite applications' contribution to the Millennium Development Goals, organized by the Office for Outer Space Affairs as part of the APSCC Conference, reviewed related outcomes of the summit on the Millennium Development Goals held at United Nations Headquarters in New York from 20 to 22 September 2010, with a view to identifying additional ways in which satellite-based technology could contribute to improving the situation with regard to health, disaster management and education. In particular, attention was paid to exploring how different kinds of broadband satellite services could contribute to achieving some of the Millennium Development Goals. Applications such as tele-epidemiology and telehealth, telemedicine and health, and distance learning were addressed. The Office for Outer Space Affairs and the APSCC Secretariat agreed to organize a similar panel on satellite applications at the following APSCC Conference, in 2011.

52. As a follow-up to the Workshop on Applications of Telehealth to Service Delivery in Public Health and Environment held in Bhutan in July 2009, Nepal has joined the South Asian Association for Regional Cooperation (SAARC) Telemedicine Network funded by the Government of India. A telemedicine node has been installed at Patan Hospital, in Kathmandu, and is currently operational. Telenursing education was the first application implemented.

D. Summary of activities related to the United Nations Programme on Space Applications

1. Activities of the Programme carried out in 2010

53. In 2010, one symposium, one training course and seven workshops were conducted within the framework of the Programme. The list of activities is presented in annex I.

2. Activities of the Programme scheduled for implementation in 2011

54. The meetings, seminars, symposiums, training courses and workshops scheduled for 2011, including their objectives, are listed in annex II.

3. Activities of the regional centres for space science and technology education, affiliated to the United Nations, for 2009-2012

55. The nine-month postgraduate courses to be offered by the regional centres for space science and technology education, affiliated to the United Nations, in the period 2009-2012 are listed in annex III.

V. Voluntary contributions

56. The successful implementation of the Programme activities in 2010 benefited from the support and voluntary contributions in cash and in kind from Member States and their institutions, as well as from the assistance and cooperation of regional and international governmental and non-governmental organizations.

57. The following Member States and governmental and non-governmental organizations provided support for the activities of the Programme in 2010:

(a) ESA provided US\$ 80,000 in support of those activities of the Programme in 2010 which it co-sponsored (see annex I);

(b) Austria, through its Federal Ministry for European and International Affairs, the State of Styria and the City of Graz, defrayed the costs of the international air travel of participants, local organization and facilities, and room, board and local transportation of participants in the United Nations/Austria/European Space Agency Symposium on Small Satellite Programmes for Sustainable Development, held in Graz, Austria, from 21 to 24 September 2010 (see annex I);

(c) The Japan Aerospace Exploration Agency (JAXA) provided US\$ 10,000 in support of the United Nations/National Aeronautics and Space Administration/Japan Aerospace Exploration Agency Workshop on the International Space Weather Initiative, held in Cairo from 6 to 10 November 2010;

(d) The International Astronautical Federation provided €20,000 in support of the United Nations/International Astronautical Federation Workshop on Global Navigation Satellite System Applications for Human Benefit and Development, held in Prague on 24 and 25 September 2010, and provided sufficient funds to cover the registration of 25 participants in the 61st International Astronautical Congress;

(e) The United States provided US\$ 200,000 in support of the implementation of the ICG workplan, focusing on information dissemination and capacity-building, as well as selected activities related to GNSS applications;

(f) Those host Governments of events held in the framework of the Programme which defrayed the costs of local organization and facilities, and room, board and local transportation for some participants from developing countries (see annex I). The in-kind support given in 2010 by such Governments is estimated to have amounted to about US\$ 280,000;

(g) Those Member States and their space-related institutions, as well as regional and international organizations, which provided sponsorship for experts to make technical presentations and participate in deliberations on activities of the Programme (see annex I and reports on activities).

VI. Financial provisions and administration of activities in the biennium 2010-2011

58. The activities of the Programme in 2011 covered in the present report will be implemented as follows:

(a) *Financial provisions.* Under the regular budget of the United Nations from the resource allocation for fellowships and grants in the programme budget approved by the General Assembly at its sixty-fourth session for implementing the activities of the Programme during the biennium 2010-2011, an amount of US\$ 374,400 will be used to implement the activities of the Programme in 2011. In order to carry out effectively its mandated and expanded activities, in particular those aimed at implementing the recommendations of UNISPACE III, the Programme must solicit additional funds, in the form of voluntary contributions, in support of its activities. Those contributions will be used to supplement the regular budget of the Programme;

(b) *Administration by and contributions and participation of staff.* The Office for Outer Space Affairs will carry out the activities described in the present report. In that connection, travel will be undertaken, as appropriate, by staff of the Office under the provisions of the travel budget of the Office for the biennium and, as may be necessary, from voluntary contributions.

Annex I United Nations Programme on Space Applications: meetings, seminars, symposiums, training courses and workshops held in 2010

<i>Title of activity and place and date held</i>	<i>Sponsoring country</i>	<i>Sponsoring organization</i>	<i>Host institution</i>	<i>Funding support</i>	<i>Number of countries and entities represented</i>	<i>Number of participants</i>	<i>Document symbol of report</i>
United Nations/Republic of Moldova/United States of America Workshop on the Applications of Global Navigation Satellite Systems Chisinau 17-21 May 2010	Republic of Moldova, United States	International Committee on Global Navigation Satellite Systems (ICG)	Agency for Land Relations and Cadastre	The United Nations and co-sponsors provided full or partial financial support for 19 participants.	18	80	A/AC.105/974
United Nations/Turkey/United States of America/European Space Agency Workshop on Space Technology Applications for Socio-Economic Benefits Istanbul, Turkey 14-17 September 2010	Turkey	United Nations, European Space Agency (ESA)	Scientific and Technological Research Council of Turkey	The United Nations and co-sponsors provided full or partial financial support for 19 participants.	29	120	A/AC.105/986
United Nations/Austria/European Space Agency Symposium on Small Satellite Programmes for Sustainable Development Graz, Austria 21-24 September 2010	Austria	United Nations	Austrian Academy of Sciences, Institute of Space Research	The United Nations and co-sponsors provided full or partial financial support for 16 participants.	38	117	A/AC.105/983
20th United Nations/International Astronautical Federation Workshop on Global Navigation Satellite Systems Applications for Human Benefit and Development Prague 24-25 September 2010	Czech Republic	United Nations, International Astronautical Federation (IAF), ESA, ICG	Ministry of Education, Youth and Sports of the Czech Republic, Czech Space Office	The United Nations and co-sponsors provided full or partial financial support for 31 participants. IAF also waived registration fees for 25 participants in the International Astronautical Congress. Host	47	85	A/AC.105/984

<i>Title of activity and place and date held</i>	<i>Sponsoring country</i>	<i>Sponsoring organization</i>	<i>Host institution</i>	<i>Funding support</i>	<i>Number of countries and entities represented</i>	<i>Number of participants</i>	<i>Document symbol of report</i>
Eleventh United Nations/International Academy of Astronautics Workshop on Small Satellites in the Service of Developing Countries Prague 28 September 2010	Czech Republic	United Nations, International Academy of Astronautics (IAA)	IAA	N/A	N/A	100	A/AC.105/995
United Nations/National Space Research and Development Agency/Regional Centre for Training in Aerospace Surveys/Obafemi Awolowo University/African Regional Centre for Space Science and Technology Education – in English language Ile-Ife, Nigeria 4-29 October 2010	Nigeria	United Nations, National Space Research and Development Agency, Regional Centre for Training in Aerospace Surveys, Obafemi Awolowo University	African Regional Centre for Space Science and Technology Education – in English language	The United Nations and co-sponsors provided full or partial financial support for 20 participants.	9	20	N/A
United Nations/Plurinational State of Bolivia/European Space Agency Workshop on Integrated Space Technology Applications for Sustainable Development in the Mountain Regions of Andean Countries	Plurinational State of Bolivia	United Nations, ESA, Ministerio de Desarrollo Rural y Tierras, Ministerio de Educación a través del Viceministerio de Ciencia y Tecnología and Centro de Investigaciones y de	Universidad Mayor de San Simon	The United Nations and co-sponsors provided financial support to 25 participants. Host institutions provided conference facilities, local	13	100	A/AC.105/997

<i>Title of activity and place and date held</i>	<i>Sponsoring country</i>	<i>Sponsoring organization</i>	<i>Host institution</i>	<i>Funding support</i>	<i>Number of countries and entities represented</i>	<i>Number of participants</i>	<i>Document symbol of report</i>
Cochabamba, Plurinational State of Bolivia 25-29 October 2010		Servicios en Teledetección (CISTEL) of the Universidad Mayor de San Simon		transportation and technical and secretarial support, and organized a number of social events.			
United Nations/National Aeronautics and Space Administration/Japan Aerospace Exploration Agency Workshop on the International Space Weather Initiative Helwan, Egypt 6-10 November 2010	Egypt	United Nations, National Aeronautics and Space Administration (NASA), Japan Aerospace Exploration Agency (JAXA), ICG, Kyushu University, Ministry of Higher Education and Scientific Research of Egypt, Helwan University through its Space Weather Monitoring Centre	Helwan University	The United Nations provided full financial support for 14 participants. The host institutions provided conference facilities, local transportation and technical and secretarial support, and organized a number of social events.	30	120	A/AC.105/998
United Nations/Thailand Workshop on Space Law Bangkok 16-19 November 2010	Thailand	United Nations, Geo-Informatics and Space Technology Development Agency, ESA, Asia-Pacific Space Cooperation Organization (APSCO)	Geo-Informatics and Space Technology Development Agency	The United Nations and co-sponsors provided full financial support for 23 participants. The host institutions provided conference facilities, local transportation, technical and secretarial support and hotel accommodation, and organized a number of social events.	22 States and four international intergovernmental organizations (United Nations, ESA, APSCO, International Institute for the Unification of Private Law (Unidroit))	122	A/AC.105/989

Annex II

United Nations Programme on Space Applications: schedule of meetings, seminars, symposiums, training courses and workshops for implementation in 2011

<i>Title</i>	<i>Co-sponsor/co-organizer</i>	<i>Place and date</i>	<i>Objective</i>
United Nations/United Arab Emirates Workshop on the Applications of Global Navigation Satellite Systems	Co-sponsored by the United States through the International Committee on Global Navigation Satellite Systems (ICG)	Dubai, United Arab Emirates 16-20 January 2011	(a) To update ongoing activities related to the use of global navigation satellite systems (GNSS) technology in participating countries; (b) to identify the specific needs of individual plans and projects on GNSS, taking into consideration the local institutional settings, including specific training and capacity-building needs; (c) to develop a regional plan of action that would contribute to the wider use of GNSS technology and its applications, including the possibility of one or more national and/or regional pilot projects, into which interested institutions could incorporate the use of GNSS technology.
United Nations/Argentina International Conference on the Use of Space Technology for Water Management	Co-organized by the European Space Agency (ESA) and Prince Sultan bin Abdulaziz International Prize for Water	Buenos Aires 14-18 March 2011	To follow up on the conference on the same subject held in 2008 in Saudi Arabia and to continue discussions on how space technology can contribute to the better management of water resources, including by combating desertification, ensuring access to safe drinking water and managing water-related emergencies in developing countries.
United Nations/Syria Workshop on Integrated Space Technology Applications: Support to Monitor Climate Change and its Impact on Natural Resources	N/A	Damascus 23-26 May 2011	To focus on the use of space-related technologies and information for monitoring climate change, with a view to exploring ways to solve social and economical issues related to climate change and global warming. Participants in the workshop will also discuss opportunities for increasing regional and international cooperation among developing countries and between developing and industrialized countries.

<i>Title</i>	<i>Co-sponsor/co-organizer</i>	<i>Place and date</i>	<i>Objective</i>
United Nations/Viet Nam Workshop on Space Technology Applications for Socio-Economic Benefits	Co-sponsored by ESA	Hanoi 2011	To follow up on the workshop on the same subject held in 2010 in Turkey and to continue discussions on how space technology could be used in, for example, aviation, maritime and land transportation, urbanization, mapping and surveying, human health, disaster management, environmental monitoring and natural resources management, to increase awareness of the socio-economic benefits of applying space technology at the national, regional and international levels.
United Nations/Canada Workshop on the Contribution of Tele-epidemiology to Public Health in the Context of Climate Change Adaptation	Co-sponsored by ESA	Montreal, Canada 21-24 June 2011	To foster cross-disciplinary initiatives and the operational integration of all entities with a mandate to promote human health around the world. Tele-epidemiology, a transdisciplinary area that is developing quickly, uses space-based systems such as Earth observations, satellite navigation and satellite communications systems in epidemiological studies and public health surveillance and interventions relating to health events in populations. It is foreseen that the application of tele-epidemiology to public health will result in significant progress in addressing the effects of global environmental changes in terms of population growth, travel, migration, land-use changes and natural disasters. Climate change too is predicted to play a key role in public health.
United Nations/Islamic Republic of Iran Regional Workshop on the Use of Space Technology for Improving Human Health	N/A	Tehran 16-19 July 2011	To promote awareness of the use of space technology in health care and to review the benefits that space technology would bring to telehealth/telemedicine, tele-epidemiology, and tele-education in medicine. Applications such as mobile health and biostatistics will also be addressed. The capabilities of satellite-based technologies have not been fully disseminated to the health investigators and agencies that could be using them. This workshop aims to contribute to closing that gap.
United Nations/Austria Symposium on the Use of Small Satellites for Sustainable Development	Co-sponsored by ESA	Graz, Austria 13-16 September 2011	To promote, in the framework of the Basic Space Technology Initiative, the development and use of basic space technology. The symposium will serve as a departing point for a future series of United Nations regional space technology conferences, to be held starting in 2012. In addition to addressing the technical

<i>Title</i>	<i>Co-sponsor/co-organizer</i>	<i>Place and date</i>	<i>Objective</i>
			aspects of small satellites, participants in the symposium will consider regulatory and legal issues related to small satellite development, such as space debris mitigation measures, and procedures for frequency allocation and satellite registration.
United Nations Workshop on Space for Human and Environmental Security	Co-sponsored by the International Astronautical Federation, the International Academy of Astronautics and ESA	Cape Town, South Africa 30 September-2 October 2011	To exchange experiences in space science and technology applications and to discuss opportunities for increasing regional and international cooperation among developing countries and between developed and developing countries.
United Nations Expert Meeting on the Human Space Technology Initiative	N/A	Putrajaya, Malaysia 2011	To exchange information about the International Space Station (ISS), between ISS partners and ISS user communities, as well as to discuss ways of facilitating the utilization of ISS in the framework of the Office for Outer Space Affairs' Human Space Technology Initiative.
United Nations/Nigeria Workshop on the International Space Weather Initiative	Co-organized by the National Aeronautics and Space Administration, the Japan Aerospace Exploration Agency, Kyushu University and ICG	Abuja 17-21 October 2011	To build on the achievements of past workshops on the International Space Weather Initiative, to further the deployment of worldwide, ground-based space weather instrument arrays and to analyse data recorded by those arrays.
United Nations International Meeting on Global Navigation Satellite Systems	Co-sponsored by the United States through ICG	Vienna 5-9 December 2011	To build on the achievements of past international meetings and workshops on the applications of GNSS, to review the status of follow-up projects and initiatives and to consider the kind of support that could be provided by ICG.

Annex III

Regional centres for space science and technology education, affiliated to the United Nations: schedule of nine-month postgraduate courses, 2009-2012

1. Regional Centre for Space Science and Technology Education in Asia and the Pacific

<i>Year</i>	<i>Venue</i>	<i>Activity</i>
2009-2010	Indian Institute of Remote Sensing, Dehra Dun, India	Fourteenth Postgraduate Course on Remote Sensing and Geographic Information Systems (GIS)
2010-2011	Indian Institute of Remote Sensing, Dehra Dun, India	Fifteenth Postgraduate Course on Remote Sensing and Geographic Information Systems (GIS)
2009-2010	Space Applications Centre, Ahmedabad, India	Seventh Postgraduate Course on Satellite Communications
2011-2012	Indian Institute of Remote Sensing, Dehra Dun, India	Sixteenth Postgraduate Course on Remote Sensing and GIS
2010-2011	Space Applications Centre, Ahmedabad, India	Seventh Postgraduate Course on Satellite Meteorology and Global Climate
2010-2011	Physical Research Laboratory, Ahmedabad, India	Seventh Postgraduate Course on Space and Atmospheric Science

2. African Regional Centre for Space Science and Technology — in French language

<i>Year</i>	<i>Venue</i>	<i>Activity</i>
2009-2010	Mohammadia School of Engineers, University of Mohamed V, Agdal, Rabat	Third Postgraduate Course on Satellite Meteorology and Global Climate
2010-2011	Mohammadia School of Engineers, University of Mohamed V, Agdal, Rabat	Seventh Postgraduate Course on Remote Sensing and GIS
2011-2012	Mohammadia School of Engineers, University of Mohamed V, Agdal, Rabat	Fourth Postgraduate Course on Satellite Communications

3. African Regional Centre for Space Science and Technology Education — in English language

<i>Year</i>	<i>Venue</i>	<i>Activity</i>
2010-2011	Obafemi Awolowo University, Ile-Ife, Nigeria	Ninth Postgraduate Course on Remote Sensing and GIS
2010-2011	Obafemi Awolowo University, Ile-Ife, Nigeria	Fourth Postgraduate Course on Space and Atmospheric Sciences
2010-2011	Obafemi Awolowo University, Ile-Ife, Nigeria	Third Postgraduate Course on Satellite Meteorology and Global Climate
2010-2011	Obafemi Awolowo University, Ile-Ife, Nigeria	Eighth Postgraduate Course on Satellite Communications

4. Regional Centre for Space Science and Technology Education in Latin America and the Caribbean

<i>Year</i>	<i>Venue</i>	<i>Activity</i>
2010-2010	National Institute for Space Research, Santa Maria, Rio Grande do Sul, Brazil	Seventh Postgraduate Course on Remote Sensing and GIS
2010-2011	National Institute for Space Research, Santa Maria, Rio Grande do Sul, Brazil	Eighth Postgraduate Course on Remote Sensing and GIS
2009-2010	National Institute of Astrophysics, Optics and Electronics, Tonantzintla, Puebla, Mexico	Fifth Postgraduate Course on Remote Sensing and GIS
2010-2011	National Institute of Astrophysics, Optics and Electronics, Tonantzintla, Puebla, Mexico	Sixth Postgraduate Course on Remote Sensing and GIS
2010-2011	National Institute of Astrophysics, Optics and Electronics, Tonantzintla, Puebla, Mexico	Fourth Postgraduate Course on Satellite Communications