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Committee on the Peaceful Uses of Outer Space

Report of the Expert on Space Applications*

Contents

* In the present report, it was necessary to summarize each of the activities organized during 2013 under the United Nations Programme on Space Applications, the last of which was concluded on 16 December 2013.

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I. Introduction

1. At its fiftieth session, in 2013, 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 2012 had been carried out satisfactorily. The Subcommittee recommended to the Committee, for its approval, the activities scheduled for 2013 and noted the other activities of the Programme. On the recommendation of the Committee, the activities of the Programme for 2013 were endorsed by the General Assembly in its resolution 67/113. Information on the activities carried out within the framework of the Programme in 2013 and those scheduled for 2014 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 decided that the United Nations Programme on Space Applications should be directed towards the following objectives:

(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;

(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 the Third United Nations Conference on the Exploration

and Peaceful Uses of Outer Space (UNISPACE III)[1] (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, define and work towards objectives achievable in two to five years, and build on the results of previous activities. The selected areas are environmental monitoring, natural resource management, satellite communications for tele-education and telemedicine applications, disaster risk reduction, the use of global navigation satellite systems (GNSS), the Basic Space Science Initiative, space law, climate change, the Basic Space Technology Initiative and the Human Space Technology Initiative.

6. Additional Programme directions include spin-offs of space technology, promotion of youth participation in space activities and promotion of private industry participation in the activities of the Programme.

7. 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 short- and medium-term training programmes;

(c) Conducting initiatives with long-term plans to enhance capacity-building activities in basic space science, basic space technology and human space technology;

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

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

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[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).

[2] Ibid., chap. I, resolution 1.

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

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

8. The Basic Space Science Initiative, launched in 1990, is a long-term effort for the development of astronomy and space science through regional and international cooperation in the field on a worldwide basis, in particular in developing countries. The Initiative has contributed to the international and regional development of astronomy and space science through annual workshops on basic space science, the organization of the International Heliophysical Year 2007 and the implementation of the International Space Weather Initiative. The Basic Space Science Initiative has led to the establishment of planetariums, astronomical telescopes and space weather instrument arrays, especially in developing countries. Currently, more than 1,000 instruments are operating worldwide as part of 17 different International Space Weather Initiative arrays.

9. The Basic Space Technology Initiative was launched in 2009 to support capacity-building in space technology development, with a particular focus on small-satellite missions. After the conclusion in 2011 of a three-year series of symposiums on small-satellite programmes held in Graz, Austria, a new series of international symposiums on basic space technology development was started in 2012. The development of a curriculum on space technology engineering under a multi-year workplan commenced in 2012. With regard to fellowship opportunities, the United Nations/Japan Long-Term Fellowship Programme on Nanosatellite Technologies, implemented in cooperation with the Government of Japan and the Kyushu Institute of Technology, was continued.

10. The Human Space Technology Initiative was launched in 2010 with the aim of promoting international cooperation in human spaceflight and space exploration-related activities; promoting increased awareness among countries of the benefits of utilizing human space technology and its applications; and building capacity in microgravity education and research. The Initiative connects different partners from the international space community, United Nations entities and Member States. In close cooperation with the International Space Station partners, information on the International Space Station has been provided. The Initiative is currently conducting its primary science activity, the Zero-Gravity Instrument Project, and has launched a new fellowship programme called the Drop Tower Experiment Series. For more information, see *Human Space Technology Initiative* (ST/SPACE/62/Rev.1).

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

11. In its resolution 68/75, the General Assembly noted with appreciation that the regional centres for space science and technology education, affiliated to the United Nations, had continued their education programmes in 2013, and agreed that the

regional centres should continue to report to the Committee on the Peaceful Uses of Outer Space on their activities.

12. The sixth meeting of the Governing Board of the African Regional Centre for Space Science and Technology Education — in English language, affiliated to the United Nations, was held in Abuja on 18 April 2013. Representatives of 13 African States members of the Board took part in the meeting, at which they discussed the amended agreement proposed by the Centre in 2010, considered matters arising from the 2012 Board meeting and approved the Centre's progress report for 2012 and its programme of work and budget for the period 2013-2014. The Governing Board also adopted a joint communiqué that, among other matters, commended the achievements made by the Centre and its role in capacity-building processes in the region and supported the efforts of the Centre to introduce a new nine-month programme in GNSS in 2014 and to initiate a programme in 2013 leading to a master's degree.

13. The eighteenth meeting of the Governing Board of the Centre for Space Science and Technology Education in Asia and the Pacific, affiliated to the United Nations, was held in Bangalore, India, on 21 November 2013. The Board was informed that the Centre had trained 1,260 students from 35 countries in the Asia-Pacific region, and 29 students from outside the region. A total of 115 students had been awarded a master's in technology after the successful completion of the Postgraduate Course on Remote Sensing and Geographic Information Systems. The meeting approved the performance report and audit report of the Centre for 2013, as well as its programme of work and budget for 2014. The Islamic Republic of Iran joined the Governing Board of the Centre and became the first country from Western Asia to join the Governing Board.

14. 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. Information, 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). On the basis of 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 space-related entities on the activities of the centres.

15. The overall goal of the regional centres remains to develop, through in-depth education, indigenous capacity for research and applications in remote sensing and geographic information systems, satellite meteorology and global climate, satellite communications, space and atmospheric science and GNSS. Curricula for those disciplines have been developed at meetings held in the framework of the Programme. A model curriculum is being further developed under the auspices of the United Nations in the area of space law.

16. From 28 to 30 September 2013, the Office for Outer Space Affairs facilitated an evaluation mission to Beihang University in Beijing in response to a proposal by the Government of China to establish a regional centre for space science and technology education, to be hosted by the University, under the United Nations

Programme on Space Applications. The evaluation mission was successfully concluded and resulted in the recommendation to accept the offer of the Government of China for the establishment of a regional centre hosted at Beihang University.

17. Information on the postgraduate courses offered by the regional centres supported under the Programme are included in annex III.

2. Fellowship programmes for training

18. 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, launched an offer of 12-month fellowships for postgraduate study on GNSS and related applications for specialists from developing countries. The tenth class of the fellowship programme commenced in October 2013. Five representatives of governmental organizations and research and academic institutions from Gambia and Viet Nam were selected by the Office for Outer Space Affairs and the sponsoring organizations for fellowships to study at the Politecnico di Torino in Turin, Italy.

19. The Office for Outer Space Affairs and the Government of Japan continued the United Nations/Japan Long-Term Fellowship Programme on Nanosatellite Technologies in cooperation with the Kyushu Institute of Technology, as part of capacity-building activities under the Basic Space Technology Initiative. In 2013, admission to the programme was increased from two students to four doctoral and two master's degree students annually. Five candidates, from Egypt, Romania, Singapore, the Sudan and Ukraine, selected from among 83 qualified applicants from 28 countries, began their studies at the Institute in October 2013. The deadline for applications for the 2014 programme is 27 January 2014. Details of the application procedure are available from the website of the Office for Outer Space Affairs.

20. The Office for Outer Space Affairs and the Government of Germany launched the Drop Tower Experiment Series in November 2013. It is a new fellowship programme that aims at contributing to the capacity-building and education of students from developing countries. In collaboration with the Center of Applied Space Technology and Microgravity and the German Aerospace Center (DLR), it offers the selected research team the opportunity to conduct its own microgravity experiments at the Drop Tower in Bremen, Germany. The series of experiments will consist of four drops or catapult launches, which correspond to approximately 5 and 10 seconds of microgravity, respectively. Applications will be accepted annually. The Bremen Drop Tower is a ground-based laboratory with a drop tube height of 146 metres and can enable short-term microgravity for various scientific fields such as fluid physics, combustion, thermodynamics, materials science and biotechnology.

B. Projects for capacity-building in developing countries

21. The Zero-Gravity Instrument Project was launched in 2012, as part of the capacity-building activities of the Human Space Technology Initiative. Under the Project, a number of microgravity-simulating instruments called clinostats have been distributed to schools and institutions worldwide. The Project is expected to

provide unique opportunities for students and researchers to observe natural phenomena under simulated microgravity conditions on the ground and to inspire them to undertake further study in the fields of space science and space technology. In order to provide straightforward instructions for teachers and students on performing experiments on plant growth using the clinostats in a school laboratory, the Teacher's Guide to Plant Experiments in Microgravity (ST/SPACE/63) was developed and is now available from the website of the Office for Outer Space Affairs (www.oosa.unvienna.org/oosa/en/SAP/hsti/zgip.html). Nineteen schools and institutions from the following countries have been selected to take part in the first-cycle of the Project: Chile, China, Ecuador, Ghana, Iran (Islamic Republic of), Iraq, Kenya, Malaysia, Nigeria, Pakistan, Thailand and Viet Nam. The announcement of the call for applications for the second cycle of the Project will be made in the first quarter of 2014.

C. Space science and technology and their applications

1. Environmental monitoring and natural resource management

22. The United Nations/Pakistan International Workshop on Integrated Use of Space Technologies for Food and Water Security was held in Islamabad from 11 to 15 March 2013 (A/AC.105/1054). The event was co-sponsored by the Inter-Islamic Network on Space Sciences and Technology (ISNET) and was hosted by the Space and Upper Atmosphere Research Commission of Pakistan, on behalf of the Government of Pakistan. The objectives of the workshop were as follows: (a) enhancing the capabilities of countries on the use of space-related technologies, applications, services and information for identifying and managing water resources and addressing food security concerns; (b) examining low-cost space-related technologies and information resources that are available for addressing water and food security needs in developing countries; (c) promoting educational and public awareness initiatives in the areas of water and food security, and to contributing to capacity-building processes in those areas; (d) increasing awareness among decision makers and the research and academic community of space technology applications for addressing water- and food-related issues, primarily in developing countries; and (e) strengthening international and regional cooperation in those areas.

23. The three working groups, established to consider thematic issues and concerns, made several recommendations, including: (a) improving data collection for mountain regions; (b) establishing commonly agreed standards for data exchange and reporting; (c) developing a global mountain database and portal with metadata on projects and links to secondary data and map products; and (d) bridging the gap between the academic community and local users using traditional and social media or through workshops and specific events. It was also agreed that, with respect to capacity-building, there was a need for training in areas such as the use of space technologies for monitoring mountain regions, data processing and the development of applications for water resources, and flood modelling and drought and ground water modelling.

24. The United Nations/Indonesia International Conference on Integrated Space Technology Applications to Climate Change was held in Jakarta from 2 to 4 September 2013 (A/AC.105/1049). It was co-organized by the Office for Outer

Space Affairs and the National Institute of Aeronautics and Space of Indonesia, and benefited from support provided by the European Space Agency (ESA). The Conference was convened to achieve the following objectives: (a) facilitating discussions regarding ways in which countries affected by climate change could make better use of integrated space technology applications to assess vulnerability to climate change; (b) identifying potential alternatives in the context of adaptation to and mitigation of climate change; (c) improving synergies among space agencies and organizations in relation to efforts relating to climate change; (d) strengthening international and regional cooperation in that area; and (e) raising awareness on the recent advances in space-related technologies, services and information resources that could be used to assess the impacts of climate change and the effects of measures implemented to reduce such impacts.

25. Participants recommended the establishment of a dedicated section on the website of the Office for Outer Space Affairs to collect the needs of Governments, showcase best practices and provide links to relevant resources and guidelines; such a section could also provide step-by-step methodologies on the use of integrated space technology applications to assess vulnerability and characterize the effects of climate change, and the resources available through it would also help to monitor the results of adaptation and mitigation measures implemented in different regions of the world. They also recommended the facilitation, by the Office, of interaction among stakeholders for the development of geoviewers to visualize relevant geospatial information, the establishment of data policies incorporating spatial database infrastructure as a way of facilitating the sharing of data and information among agencies and the use of space applications to track the effects of climate change on livelihoods around the world. The Conference served as a vehicle to identify ways in which space-based information could contribute to efforts conducted worldwide under the auspices of the recently established Adaptation Committee of the United Nations Framework Convention on Climate Change.

26. The twenty-third United Nations/International Astronautical Federation Workshop on Space Technology for Economic Development was held in Beijing from 20 to 22 September 2013 (A/AC.105/1048), in conjunction with the sixty-fourth International Astronautical Congress. The Workshop was organized jointly by the Office for Outer Space Affairs and the International Astronautical Federation (IAF), in cooperation with the International Academy of Astronautics (IAA), the Committee on Space Research and the International Institute of Space Law. It was co-sponsored by ESA and the Chinese Society of Astronautics. Participants discussed technologies, applications and services that could help to maximize the benefits of the use and application of space-related tools to support sustainable economic development and to enhance the capacity of developing countries in that area through developing human and technical resources at various levels, improving regional and international cooperation, increasing public awareness and developing appropriate infrastructures.

27. The technical programme of the Workshop focused on space applications for agriculture and land use and applications of space technology for disaster management. The Workshop included four technical sessions, two working group meetings and a final round-table discussion. The conclusions of the Workshop included: (a) the user community needed to be strengthened by, among others, identifying and characterizing users and their specific needs and increasing

interactions and partnerships between space data developers and public entities, and with end-user service providers and end users; (b) the benefits of space technologies for economic development needed to be demonstrated to policymakers, decision makers and the general public; (c) problems and legal impediments with regard to sharing data with end users on a global basis needed to be resolved; and (d) capacity-building efforts in the thematic areas of land use and food security and in disaster management were required. Participants also emphasized the importance of the standardization of data and of products used for disaster management and recognized that there was a lack of universal product standards in terms of space-based information for disaster management.

28. The United Nations/Belarus Workshop on Space Technology Applications for Socioeconomic Benefits was held in Minsk from 11 to 15 November 2013 (A/AC.105/1053). The Workshop was hosted by the Belarusian State University on behalf of the Government of Belarus, and it was co-sponsored by the Secure World Foundation. It was the fourth in the series of workshops organized within the framework of the Programme on Space Applications for promoting the use of space technology and its applications for socioeconomic benefits, primarily in developing countries. The objectives of the Workshop were: (a) to share information on research and applications studies that have demonstrated the use of space technology for societal benefit; (b) to address principles and mechanisms for enhancing national, regional and international cooperation in space technology development and applications; and (c) to demonstrate the benefits of various space technology applications in priority areas established by the United Nations Conference on Sustainable Development.

29. Through presentations at its technical sessions, general discussions and working group meetings, participants at the Workshop considered Earth observation for land use, environmental monitoring and natural resources management; the application of space technology for food and water security; GNSS and satellite communications; development of space systems and equipment; space applications for disaster management and emergency response; space technology for national socioeconomic development programmes; capacity-building in space science and technology; and regional and international cooperation. Discussions in the working groups resulted in a number of conclusions and recommendations, including the following: (a) the practice of conducting short- and long-term training courses and workshops on the application of space technologies in various areas in order to share best and innovative practices should continue, in cooperation with the appropriate United Nations agencies; (b) an Internet-based central portal for information on outreach activities, training opportunities and capacity-building initiatives for developing countries should be established; (c) the activities of the regional centres for space science and technology education, affiliated to the United Nations, should be supported, and the expansion of that network should be considered; and (d) all necessary steps should be taken for the prompt and smooth transfer of appropriate space-related technologies from research and development and academic domains to end-user communities, including the establishment of regional support offices for the transfer of space technology to achieve that objective.

2. Enabling space technologies

30. The United Nations/Croatia Workshop on the Applications of Global Navigation Satellite Systems was held in Baška, Croatia, from 21 to 25 April 2013 (A/AC.105/1055). It was organized by the Office for Outer Space Affairs and the Faculty of Maritime Studies of the University of Rijeka, on behalf of the Government of Croatia. The Workshop was co-sponsored by the United States of America (through the International Committee on Global Navigation Satellite Systems (ICG)) and hosted by the Faculty of Maritime Studies. The main objective of the Workshop was to provide a forum in which participants could share their technical expertise and experiences in specific GNSS-related projects through formal presentations and panel discussions. Furthermore, the Workshop was dedicated to developing a regional plan of action that would contribute to the wider use of GNSS technology and its applications, including the possible establishment of specific pilot projects in which interested institutions could work together at the national and/or regional level.

31. Participants noted that providing new GNSS educational opportunities at various levels would be the best way to cover the different needs in the GNSS field and ensure that capacity-building activities were accomplished efficiently and to the benefit of all Member States. They also noted that a scientific and research laboratory was under development in Baška, with the aim of providing the framework for a GNSS science, research and education programme to study the local dynamics of space weather and the ionosphere and GNSS performance.

32. The United Nations/China Workshop on Human Space Technology was held in Beijing from 16 to 20 September 2013 (A/AC.105/1050). It was hosted by the China Manned Space Agency on behalf of the Government of China and was co-organized by the Office for Outer Space Affairs and IAA. The Workshop was an extension of the United Nations/Malaysia Expert Meeting on Human Space Technology held in Putrajaya, Malaysia, from 14 to 18 November 2011 (A/AC.105/1017). The Workshop aimed at exchanging information on the latest developments and future plans relating to human space flight and space exploration, identifying potential opportunities for emerging spacefaring countries to participate in space exploration-related activities, creating further awareness among Member States of the benefits of human space technology and its applications, and building capacity for microgravity science education and research.

33. Participants at the Workshop recognized that human space exploration could be regarded as a common goal of humanity that could unite the world, and that all countries, particularly developing countries, should be encouraged to become involved in understanding and defining the common goals and benefits of human space exploration. It was recommended that the Human Space Technology Initiative should play a role in facilitating international collaboration on human space exploration and capacity-building by identifying opportunities for international cooperation and putting forward proposals. Governments, institutions, industry and individuals were encouraged to participate in the global human space exploration endeavour. Government and institutions were encouraged to create databases to promote the dissemination and exchange of information on human space exploration and its related activities, and to establish educational mechanisms and develop appropriate curricula to promote space science and technology.

34. The United Nations/United Arab Emirates Symposium on Basic Space Technology: Small-Satellite Missions for Developing Space Nations was held in Dubai, United Arab Emirates, from 20 to 23 October 2013 (A/AC.105/1052). The Symposium was the second in a series of international symposiums to be held as part of the Basic Space Technology Initiative in the regions that correspond to the Economic Commissions for Africa, Asia and the Pacific, Latin America and the Caribbean, and Western Asia, aimed at supporting capacity-building in basic space technology and promoting the use of space technology and its applications for the peaceful uses of outer space and in support of sustainable development.

35. Participants discussed the latest developments in the field of capacity-building in basic space technology development, in particular those related to small-satellite development. Among other observations and recommendations, the participants noted the discussions in the Committee on the Peaceful Uses of Outer Space under the agenda item on the long-term sustainability of outer space activities and also noted that the working group established under that agenda item would develop a set of voluntary guidelines for States, intergovernmental organizations, non-governmental organizations and private sector entities to promote the safety and long-term sustainability of outer space activities. Participants recommended that those involved in small-satellite activities should establish contact with the representatives of their respective Member States in the working group and its expert groups to ensure that the interests and inputs of the small-satellite community would be taken into account in the preparation of the report and guidelines of the working group.

3. Space science

36. The United Nations/Austria Symposium on Space Weather Data, Instruments and Models: Looking Beyond the International Space Weather Initiative was held in Graz, Austria, from 16 to 18 September 2013 and was organized in cooperation with the Austrian Academy of Sciences and Joanneum Research (A/AC.105/1051). Its purpose was to address the need to follow up on the recommendations of the International Space Weather Initiative related to space weather instrument availability, data-sharing and modelling requirements by bringing together space weather experts from developed and developing countries, including representatives of the major instrument operators and data providers. The Symposium was the twentieth in a series of United Nations/Austria symposiums held since 1994.

37. Participants at the Symposium made a number of recommendations on how the activities begun under the International Space Weather Initiative, including global capacity-building, education and outreach activities, could be continued and expanded. They also recommended that Member States, their national space agencies and entities funding relevant research should continue to include basic space science and operational space weather research as priority areas for funding.

D. Technical advisory services and regional cooperation

38. The International Committee on Global Navigation Satellite Systems (ICG) held its Eighth Meeting in Dubai, United Arab Emirates, from 9 to 14 November 2013 (A/AC.105/1059), and the eleventh meeting of the Providers' Forum on 9,

11 and 13 November 2013. An expert seminar on GNSS scientific and technological applications was held on 10 November 2013 as part of the Eighth Meeting of ICG. ICG considered the future scope of its work and organizational structure, and ways and means to enhance user input and the visibility of ICG. Representatives from industry, academia and governments shared views on GNSS compatibility and interoperability.

39. Pursuant to the ICG workplan, the Office for Outer Space Affairs, as the executive secretariat of ICG, concentrated on promoting the use of GNSS technologies as tools for scientific applications, including space weather effects on GNSS (A/AC.105/1060). Funds provided by the United States through ICG were used to support the workshop on the operation of AfricaArray stations held in Johannesburg, South Africa, from 15 to 18 January 2013, the workshop on GNSS data application to low-latitude ionospheric research held at the Abdus Salam International Centre for Theoretical Physics in Trieste, Italy, from 6 to 17 May 2013, and the 2013 space science school held in Nairobi from 21 October to 1 November 2013. A technical seminar on reference frames in practice was organized in cooperation with the International Federation of Surveyors and the International Association of Geodesy and was held in Manila on 21 and 22 June 2013. Participants addressed reference frame issues and precise GNSS positioning.

40. The United Nations Programme on Space Applications provided advisory assistance and financial support to the National Commission on Space Activities (CONAE) of Argentina for the organization of the Third Advanced School for Training in Landscape Epidemiology, held at the Mario Gulich Institute for Advanced Space Studies in Córdoba, Argentina, from 27 May to 7 June 2013. The training programme was organized with the aim of enhancing the use of space tools in landscape epidemiology, and support provided by the Programme helped national space agencies and research and academic institutions from developing countries in the region to participate in the event.

41. The Programme continued its cooperation with IAA and its Committee on Small-Satellite Missions in organizing a series of workshops on small satellites. The fourteenth United Nations/International Academy of Astronautics Workshop on Small Satellites in the Service of Developing Countries was held in Beijing on 24 September 2013, as part of the sixty-fourth International Astronautical Congress. The half-day Workshop was attended by more than 100 participants. The meeting featured eight technical presentations, most of them focused on the contribution that small satellites can make to supporting scientific, Earth observation and telecommunication missions, with an emphasis placed on international cooperation, education and training, and the benefits of such programmes for developing countries.

42. The Programme provided advisory assistance and technical support to the University of Koblenz-Landau, Germany, and the National Institute of Health, El Salvador, in the organization of a virtual meeting on improving public health through low-cost technology and GPS-tailored access to risk and resources. The meeting was held on 28 and 29 October 2013 and connected experts from Austria, Canada, El Salvador, Germany, India, South Africa and Sri Lanka in real time over the Internet. The meeting continued the UNISPACE III Action Team on Public Health (action team 6) follow-up initiative for an open community approach to tele-health and telemedicine, and participants discussed the use of space technology

in addressing spatial epidemiology and spatial ecotoxicology issues. Participants also discussed testing the advantages and challenges of a low-cost meeting concept as a way of minimizing the travel expenses of participants and speakers through the use of Internet-based videoconferencing technologies.

43. Under the Basic Space Technology Initiative, the Programme on Space Applications supported the first meeting of the University Space Engineering Consortium (UNISEC-Global), held in Tokyo on 23 and 24 November 2013. UNISEC-Global aims to create an international community of academic institutions and organizations involved in space engineering education and to contribute to capacity-building in space technology development at universities. Funding provided by the Programme was used to defray the costs of participation in the meeting of experts from universities in developing countries.

44. The Office for Outer Space Affairs organized special sessions on space law and GNSS on 3 and 4 December 2013, respectively, as associated events of the African Leadership Conference held in Accra from 3 to 5 December 2013. The space law session focused on capacity-building in space law, legal aspects of space debris, obligations of States under international treaties on outer space, and national legislation relevant to the peaceful exploration and use of outer space from an African perspective. The GNSS session focused on education and training programmes on GNSS and the benefits of such programmes for African countries, including projects related to real-time dual-frequency GNSS stations for ionosphere studies in Africa, as well as international cooperation. Participants recommended that States should make greater use of the space law resources available from the Office for Outer Space Affairs and increase their participation in the Committee on Peaceful Uses of Outer Space and its Legal Subcommittee. In addition, they recommended that new technical knowledge generated by the regional centres for space science and technology education, affiliated to the United Nations, located in Morocco and Nigeria should be effectively communicated to the public and the GNSS-related scientific research community.

45. The Programme provided financial support to the International Society for Photogrammetry and Remote Sensing in order to assist a number of participants from developing countries to attend the Ninth International Conference on Geoinformation for Disaster Management, which was held in Hanoi from 9 to 11 December 2013.

46. The Programme also provided advisory assistance and financial support to IAA for the organization of the IAA Space Exploration Conference and the Heads of Space Agencies Summit on Space Exploration, to be held in Washington D.C. on 9 and 10 January 2014.

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

1. Activities of the Programme carried out in 2013

47. In 2013, two symposiums, one international conference and five workshops were conducted within the framework of the Programme. Details of those activities are presented in annex I.

2. Activities of the Programme scheduled for 2014

48. The meetings, symposiums and workshops scheduled for 2014, together with 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 the period 2012-2014

49. The nine-month postgraduate courses to be offered by the regional centres for space science and technology education, affiliated to the United Nations, during the period 2012-2014, are listed in annex III.

V. Voluntary contributions

50. The successful implementation of Programme activities in 2013 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.

51. The following Member States and governmental and non-governmental organizations provided support for the activities of the Programme in 2013:

(a) Austria, which, through its Federal Ministry for European and International Affairs, the State of Styria and the City of Graz, provided €27,000 to defray the costs of international air travel for participants, the local organization and facilities, and the room, board and local transportation of participants in the United Nations/Austria Symposium on Space Weather Data, Instruments and Models: Looking Beyond the International Space Weather Initiative, held in Graz, Austria, from 16 to 18 September 2013 (see annex I);

(b) China, which provided $70,000 in support of the implementation of the Human Space Technology Initiative in 2013 and the United Nations/China Workshop on Space Law planned for 2014;

(c) Germany, which provided $10,000 in support of the implementation of the Human Space Technology Initiative;

(d) Japan, which provided $20,000 in support of the implementation of the Human Space Technology Initiative;

(e) The United Arab Emirates, which provided $10,000 in support of activities of the Programme in 2013;

(f) The United States, which provided $180,000 towards the implementation of the ICG workplan, focusing on information dissemination, capacity-building and selected activities related to GNSS applications;

(g) The 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 2013 by those Governments is estimated to have amounted to approximately $578,000;

(h) 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 individual activities);

(i) The European Commission, which provided €100,000 towards the implementation of the ICG workplan, focusing on information dissemination and capacity-building, and selected activities related to GNSS applications;

(j) ESA, which provided $55,000 in support of the activities of the Programme that it co-sponsored in 2013 (see annex I);

(k) IAF, which provided €20,000 in support of the twenty-third United Nations/International Astronautical Federation Workshop on Space Technology for Economic Development, held in Beijing from 20 to 22 September 2013, and also provided 23 participants of the Workshop who had received funding with free registration for the 64th International Astronautical Congress.

VI. Financial provisions and administration of activities in the biennium 2014-2015

52. The activities of the Programme in 2014 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-eighth session for implementing the activities of the Programme during the biennium 2014-2015, an amount of approximately $436,900 will be used to implement the activities of the Programme in 2014. In order to carry out its mandated and expanded activities effectively, 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: symposiums, conferences and workshops held in 2013

Title of activity and place and date held	*Sponsoring country*	*Sponsoring organization*	*Host institution*	*Funding support*	*Number of countries and entities represented*	*Number of participants*	*Document symbol of report*
United Nations/Pakistan International Workshop on Integrated Use of Space Technology for Food and Water Security Islamabad 11-15 March 2013	Pakistan	United Nations, Inter-Islamic Network on Space Sciences and Technology	Space and Upper Atmosphere Research Commission of Pakistan	The United Nations and co-sponsors provided full or partial financial support for 33 participants.	42	108	A/AC.105/1054
United Nations/Croatia Workshop on the Applications of Global Navigation Satellite Systems Baska, Croatia 21-25 April 2013	Croatia, United States of America	United Nations, International Committee on Global Navigation Satellite Systems (ICG)	Faculty of Maritime Studies of the University of Rijeka, Croatia	The United Nations and co-sponsors provided full or partial financial support for 15 participants.	26	65	A/AC.105/1055
United Nations/Indonesia International Conference on Integrated Space Technology Applications to Climate Change Jakarta 2-4 September 2013	Indonesia	United Nations, European Space Agency (ESA)	National Institute of Aeronautics and Space of Indonesia	The United Nations and co-sponsors provided full or partial financial support for 22 participants.	33	161	A/AC.105/1049
United Nations/Austria Symposium on Space Weather Data, Instruments and Models: Looking Beyond the International Space Weather Initiative Graz, Austria 16-18 September 2013	Austria	United Nations, ESA	Institute for Space Research of the Austrian Academy of Sciences	The United Nations and co-sponsors provided full or partial financial support for 20 participants.	13	42	A/AC.105/1051

Title of activity and place and date held	*Sponsoring country*	*Sponsoring organization*	*Host institution*	*Funding support*	*Number of countries and entities represented*	*Number of participants*	*Document symbol of report*
United Nations/China Workshop on Human Space Technology Beijing 16-20 September 2013	China	United Nations	China Manned Space Agency	The United Nations and co-sponsors provided full or partial financial support for 25 participants.	32	150	A/AC.105/1050
United Nations/International Astronautical Federation Workshop on Space Technology for Economic Development Beijing 20-22 September 2013	China	United Nations, International Astronautical Federation, ESA	Chinese Society of Astronautics	The United Nations and co-sponsors provided full or partial financial support for 23 participants. IAF also waived the registration fee for the International Astronautical Congress for 23 participants.	52	103	A/AC.105/1048
United Nations/United Arab Emirates Symposium on Basic Space Technology: Small-Satellite Missions for Developing Space Nations Dubai, United Arab Emirates 20-23 October 2013	United Arab Emirates	United Nations	Emirates Institution for Advanced Science and Technology	The United Nations and co-sponsors provided full or partial financial support for 33 participants.	45	150	A/AC.105/1052
United Nations/Belarus Workshop on Space Technology Applications for Socioeconomic Benefits Minsk 11-15 November 2013	Belarus	United Nations	Belarusian State University	The United Nations and co-sponsors provided full or partial financial support for 23 participants.	27	104	A/AC.105/1053

Annex II

United Nations Programme on Space Applications: schedule of meetings, symposiums and workshops for 2014

Title	*Place and date*	*Objective*
United Nations Expert Meeting on the International Space Station Benefits for Health	Vienna 19-20 February 2014	To focus on space-proven health applications for the benefit of underserved populations; to facilitate communication between space agencies and United Nations entities in order to identify the needs and requirements of underserved populations; to look for space-proven technologies, including human space technology, developed for the International Space Station; and to facilitate potential collaboration for their implementation for the benefit of the world.
United Nations/Morocco International Conference on the Use of Space Technology for Water Management	Rabat 1-4 April 2014	To discuss how space technology can contribute to better management of water resources, including combating desertification, ensuring access to safe drinking water and managing water-related emergencies in developing countries. The primary objectives of the conference will be the following: (a) enhancing the capabilities of countries with regard to the use of space-related technologies, applications, services and information to identify and manage water resources; (b) strengthening international and regional cooperation in that area; (c) increasing awareness among decision makers and the research and academic community about space technology applications for addressing water-related issues, primarily in developing countries; and (d) promoting educational and public awareness initiatives in water resources management, as well as capacity-building processes in that area.
United Nations/Russian Federation Workshop on the Applications of Global Navigation Satellite Systems	Krasnoyarsk, Russian Federation 26-30 May 2014	To address the use of the Global Navigation Satellite System (GLONASS) of the Russian Federation in combination with other global navigation satellite systems (GNSS) with regard to transport and communication, aviation, surveying, the environment and disasters and high-precision mobile applications; to discuss space weather effects on GNSS; and to encourage greater cooperation in developing partnerships and GNSS networks as part of the regional reference frames.

Title	*Place and date*	*Objective*
United Nations/Austria Symposium on Space Science	Graz, Austria 16-18 September 2014	To bring together renowned space science experts, covering the widest possible range of space science disciplines, to discuss the role of space science in future activities of the United Nations Programme on Space Applications. In particular, review past activities under the Basic Space Science Initiative and seek input on the topics and types of activities that could be undertaken in the framework of the United Nations Programme on Space Applications to promote international cooperation in space science.
United Nations/International Astronautical Federation Workshop on Space Technology for Socioeconomic Benefits	Toronto, Canada 26-28 September 2014	To discuss space technologies, applications, information and services that contribute to sustainable economic and social development programmes, with a primary focus on maritime applications and tele-health and tele-epidemiology; to increase awareness among decision makers and representatives of the research and academic communities of space technology applications for addressing economic development; to examine low-cost space-related technologies and information resources in the above-mentioned thematic areas that are available for addressing economic development needs in developing countries; to promote educational and public awareness initiatives and to contribute to capacity-building processes in those areas; and to strengthen international and regional cooperation.
United Nations/Ecuador Workshop on Space Technology for Sustainable Development in Mountain Regions of the Andean Countries	Quito 13-17 October 2014	To discuss how space technology can contribute to sustainable development in mountain regions, with a particular focus on the Andean countries. The workshop aims to: (a) take stock of recent advances in the use of remote sensing and GNSS applications in agriculture in mountainous environments; (b) track the state of unique ecosystems that only exist in the mountainous regions of the world; (c) track changes in the morphology of mountains owing to hazards such as landslides, mass movements and changes in land cover related to agriculture and mining practices; (d) strengthen international and regional cooperation on the use of space technology to promote sustainable development in mountain regions; (e) increase awareness among decision makers of the role that mountain regions play in sustainable development; and (f) promote educational and public awareness initiatives on mountain regions.

Title	*Place and date*	*Objective*
United Nations/Mexico Symposium on Basic Space Technology	Baja California, Mexico 20-24 October 2014	To discuss opportunities, challenges and means of capacity-building and international cooperation in space technology development, in particular as related to small-satellite activities, with a focus on the needs of countries in Latin America and the Caribbean.
United Nations/China Workshop on Space Law	Beijing November 2014	To promote understanding, acceptance and implementation of the United Nations treaties and principles on outer space, to promote an exchange of information on national space legislation and policies and to consider trends in and challenges to international space law. The Workshop will also address regulatory and institutional aspects of the use of space-derived geospatial data for sustainable development, in particular in the field of disaster risk reduction and disaster management.
United Nations/Abdus Salam International Centre for Theoretical Physics Workshop on the Use of Global Navigation Satellite Systems for Scientific Applications	Trieste, Italy 1-5 December 2014	To discuss state-of-the-art applications, with an emphasis on the scientific exploration of the Earth's environment using GNSS, and to review ongoing and planned initiatives as well as new research programmes utilizing GNSS ground- and space-based measurements to observe ionospheric and space weather phenomena, particularly in developing countries.

Annex III

Regional centres for space science and technology education, affiliated to the United Nations: schedule of nine-month postgraduate courses for the period 2012-2014

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

Year	*Venue*	*Activity*
2012-2013	Indian Institute of Remote Sensing, Dehra Dun, India	Seventeenth Postgraduate Course on Remote Sensing and Geographic Information Systems
2012-2013	Space Applications Centre, Ahmedabad, India	Eighth Postgraduate Course on Satellite Meteorology and Global Climate
2012-2013	Physical Research Laboratory, Ahmedabad, India	Eighth Postgraduate Course on Space and Atmospheric Science
2013-2014	Indian Institute of Remote Sensing, Dehra Dun, India	Eighteenth Postgraduate Course on Remote Sensing and Geographic Information Systems
2013-2014	Space Applications Centre, Ahmedabad, India	Ninth Postgraduate Course on Satellite Communications

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

Year	*Venue*	*Activity*
2012-2013	Mohammadia School of Engineers, University of Mohamed V, Agdal, Rabat	Fourth Postgraduate Course on Satellite Communications
2012-2013	Mohammadia School of Engineers, University of Mohamed V, Agdal, Rabat	Ninth Postgraduate Course on Remote Sensing and Geographic Information Systems
2013-2014	Mohammadia School of Engineers, University of Mohamed V, Agdal, Rabat	Fourth Postgraduate Course on Satellite Meteorology and Global Climate
2013-2014	Mohammadia School of Engineers, University of Mohamed V, Agdal, Rabat	Tenth Postgraduate Course on Remote Sensing and Geographic Information Systems
2013-2014	Mohammadia School of Engineers, University of Mohamed V, Agdal, Rabat	First Postgraduate Course on Global Navigation Satellite Systems

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

Year	*Venue*	*Activity*
2012	Obafemi Awolowo University, Ile-Ife, Nigeria	Tenth Postgraduate Course on Remote Sensing and Geographic Information Systems
2012	Obafemi Awolowo University, Ile-Ife, Nigeria	Ninth Postgraduate Course on Satellite Communications
2012	Obafemi Awolowo University, Ile-Ife, Nigeria	Fifth Postgraduate Course on Satellite Meteorology and Global Climate
2013	Obafemi Awolowo University, Ile-Ife, Nigeria	Eleventh Postgraduate Course on Remote Sensing and Geographic Information Systems
2013	Obafemi Awolowo University, Ile-Ife, Nigeria	Tenth Postgraduate Course on Satellite Communications
2013	Obafemi Awolowo University, Ile-Ife, Nigeria	Fifth Postgraduate Course on Space and Atmospheric Sciences

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

Year	*Venue*	*Activity*
2012	National Institute for Space Research, Santa Maria, Rio Grande do Sul, Brazil	Tenth Postgraduate Course on Remote Sensing and Geographic Information Systems
2012	National Institute of Astrophysics, Optics and Electronics, Tonantzintla, Puebla, Mexico	Fifth Postgraduate Course on Satellite Communications
2012-2013	National Institute of Astrophysics, Optics and Electronics, Tonantzintla, Puebla, Mexico	Seventh Postgraduate Course on Remote Sensing and Geographic Information Systems
2013-2014	National Institute of Astrophysics, Optics and Electronics, Tonantzintla, Puebla, Mexico	Eighth Postgraduate Course on Remote Sensing and Geographic Information Systems

5. Centre for Space Science and Technology Education for Western Asia

Year	*Venue*	*Activity*
2013-2015	Royal Jordanian Geographic Centre, Amman	First Postgraduate Course on Remote Sensing and Geographic Information Systems