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Report of the Expert on Space Applications*

Contents

	<i>Page</i>
I. Introduction	2
II. Mandate of the United Nations Programme on Space Applications	2
III. Orientation of the Programme	3
IV. Activities of the Programme.	5
A. Training for capacity-building in developing countries.	5
B. Space science, space technology and their applications	7
C. Technical advisory services and regional cooperation.	12
D. Summary of activities related to the United Nations Programme on Space Applications.	13
V. Voluntary contributions.	13
VI. Financial provisions and administration of activities in the biennium 2012-2013.	15
 Annexes	
I. United Nations Programme on Space Applications: meetings, seminars, symposiums, training courses and workshops held in 2012	16
II. United Nations Programme on Space Applications: schedule of meetings, seminars, symposiums, training courses and workshops for implementation in 2013	18
III. Regional centres for space science and technology education, affiliated to the United Nations: schedule of nine-month postgraduate courses, 2011-2013	20

* It was necessary to summarize in the present report each of the activities organized during 2012 under the United Nations Programme on Space Applications, the last of which was concluded on 14 December 2012.



I. Introduction

1. At its forty-ninth session, in 2012, 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 2011 had been carried out satisfactorily. On the recommendation of the Committee, the activities of the Programme for 2013 were endorsed by the General Assembly in its resolution 67/113 of 18 December 2012. The Subcommittee recommended to the Committee for its approval the activities scheduled for 2013 and noted the other activities of the Programme. Information on the activities carried out within the framework of the Programme in 2012 and those scheduled for implementation in 2013 are presented in annexes I and II.

II. Mandate of the United Nations Programme on Space Applications

2. In its resolution 37/90 of 10 December 1982, 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;

(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 of 20 October 2004, 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, defining and working towards objectives achievable in two to five years and built on the results of previous activities. Those priority areas of the Programme are: (a) environmental monitoring; (b) natural resource management; (c) satellite communications for tele-education and telemedicine applications; (d) disaster risk reduction; (e) developing capabilities in the use of global navigation satellite systems (GNSS); (f) the Basic Space Science Initiative, including the International Space Weather Initiative; (g) space law; (h) climate change; (i) the Basic Space Technology Initiative; and (j) the Human Space Technology Initiative.

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

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.

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

(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 nations. The Initiative has contributed to the international and regional development of astronomy and space science through annual workshops on basic space science, the establishment 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, in particular 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 in the regions that correspond to the economic commissions for Africa, Asia and the Pacific, Latin America and the Caribbean, and Western Asia, respectively. 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 expanded to support six fellows.

10. The Human Space Technology Initiative was launched in 2010 with the aims of promoting international cooperation in human space flight- and space exploration-related activities; creating awareness among countries of the benefits of utilizing human space technology and its applications; and building capacity in microgravity education and research. The Initiative has included a series of outreach activities and expert meetings, and also the new zero-gravity instrument project, its primary science activity, in which microgravity-simulating instruments will be distributed worldwide. The project is expected to provide unique opportunities for students and researchers to observe natural phenomena under conditions simulated microgravity on the ground and to inspire them to take up challenges to advance space science and technology.

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 67/113, the General Assembly noted with appreciation that the African regional centres for space science and technology education in the French and English languages, located in Morocco and Nigeria, respectively, as well as the Centre for Space Science and Technology Education in Asia and the Pacific, located in India, and the Regional Centre for Space Science and Technology Education for Latin America and the Caribbean, with campuses located in Brazil and Mexico, affiliated to the United Nations, had continued their education programmes in 2012, and agreed that the regional centres should continue to report to the Committee on the Peaceful Uses of Outer Space on their activities; and welcomed in that regard the establishment, in 2012, of the Centre for Space Science and Technology Education for Western Asia, affiliated to the United Nations, located in Jordan.

12. The Centre for Space Science and Technology Education for Western Asia is the fifth centre established in accordance with General Assembly resolution 45/72 of 11 December 1990. The Centre, hosted by the Royal Jordanian Geographic Centre in Amman, was formally inaugurated on 29 May 2012 following the signing of bilateral agreements on the establishment of the Centre by representatives of Governments of Member States from Western Asia and the constitution of its Governing Board on 28 May 2012. The Centre is expected to start offering postgraduate courses in 2013.

13. The governing boards, the overall policymaking bodies of all the regional centres, hold regular meetings. The fifth meeting of the Governing Board of the African Regional Centre for Space Science and Technology Education — in English language was held in Abuja on 22 March 2012. The fifth meeting of the Governing Board of the African Regional Centre for Space Science and Technology Education — in French language was held in Algiers on 26 June 2012. The 17th meeting of the Governing Board of the Centre for Space Science and Technology Education in Asia and the Pacific was held in Delhi, India, on 21 November 2012.

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. Reports and presentations on the activities of the regional centres are available on the website of the Office for Outer Space Affairs (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 African regional centres for space science and technology education, in the French and English languages, located in Morocco (www.crasstelf.org.ma) 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/crs/crectalc) and Mexico (www.crectalc.org), affiliated to the United Nations, have developed and maintained information portals on the World Wide Web describing their activities in detail.

16. 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 (GIS), 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. Model curricula are being further developed under the auspices of the United Nations in the areas of GNSS and space law.

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

18. The GNSS curriculum (ST/SPACE/59) was developed taking into account GNSS course outlines used at the university level in a number of developing and industrialized countries. The incorporation of elements of GNSS science and technology into university-level curricula serves a dual purpose: (a) to enable countries to take advantage of the benefits inherent in the new technologies, which in many cases are spin-offs from space science and technology; and (b) to introduce concepts of high technology in a non-esoteric fashion and to help build national capacity in science and technology in general. The curriculum will be made available to the regional centres for space science and technology education, affiliated to the United Nations. The course consists of nine modules, each covering specific areas of GNSS (theory, technology and applications). The duration of the course is 36 weeks, followed by one year of pilot-project work in the participant's home country.

19. On the occasion of the inauguration of the Centre for Space Science and Technology Education for Western Asia, the Office for Outer Space Affairs organized a meeting of the directors of the regional centres on 30 May 2012. The meeting was attended by the Directors of the Centres in Africa and by the Director of the new Centre for Western Asia, as well as by representatives of Member States in Western Asia and by the staff of the Royal Jordanian Geographic Centre in Amman. The meeting reviewed the history and overall status of the regional centres, considered the status and future updates of curricula and concluded with discussion of issues of common concern and opportunities for cooperation among the centres.

2. Fellowship programmes for training

20. 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 of GNSS and related applications for specialists from developing countries. The ninth class of the fellowship programme commenced in September 2012. Four representatives of governmental organizations and research and academic institutions from Algeria, Nigeria, the Sudan and Viet Nam were

jointly selected by the Office for Outer Space Affairs and the sponsoring organizations for fellowships to study at the Politecnico in Turin, Italy.

21. 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. Two successful candidates, selected from among 39 qualified applicants from 25 countries, began their studies at the Institute in October 2012. The Office is pleased to announce that, with the support of the Ministry of Education, Culture, Sports, Science and Technology of Japan, the Long-Term Fellowship Programme will be expanded and from 2013 to 2015 will annually accept up to four doctoral and two master's degree students under Ministry fellowships to complete their studies at the Institute. Details of the application procedure are available from the website of the Office for Outer Space Affairs.

B. Space science, space technology and their applications

1. Environmental monitoring and natural resource management

22. The United Nations/International Astronautical Federation Workshop on Space Technologies Applied to the Needs of Humanity: Experience from Cases in the Mediterranean Area, the twenty-second such joint workshop, was held in Naples, Italy, from 28 to 30 September 2012, in conjunction with and as an associated event of the 63rd International Astronautical Congress (A/AC.105/1028). 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 and the Committee on Space Research. It was co-sponsored by the European Space Agency (ESA) and the Italian Space Agency (ASI). Participants discussed space technologies, applications, information and services that contributed to sustainable economic and social development programmes, primarily in developing countries, and opportunities for increasing regional and international cooperation in those areas.

23. The Workshop included four technical sessions, two working groups and a final round-table discussion. Major conclusions concerned the need to bridge gaps in technologies and policies that affected successful implementation and operational use of space technologies, information and services; the need to further integrate data from space and in-situ sources at the global level; and the need to establish or assign a national focal point in each country in order to coordinate the activities of all relevant institutions so as to ensure that space resources were applied effectively for national benefit. Participants also stressed that a series of awareness-building workshops oriented exclusively for decision makers should be initiated in order to demonstrate to them the potential benefits of space technologies for their countries.

24. The United Nations/Chile Workshop on Space Technology Applications for Socio-Economic Benefits was held in Santiago from 12 to 16 November 2012 (A/AC.105/1036). The workshop was hosted by the Centre for Information on Natural Resources (CIREN) of Chile and organized in cooperation with the International Society for Photogrammetry and Remote Sensing (ISPRS), the National Aeronautics and Space Administration (NASA) of the United States of America and the Regional Office for Latin America and the Caribbean of the Food

and Agriculture Organization of the United Nations. The Workshop was co-sponsored by the Secure World Foundation. Its overall objective was to increase awareness among policymakers and planners of the socioeconomic benefits of utilizing space technology. The Workshop contributed to international cooperation by providing opportunities to exchange in-depth information on space technology applications for socioeconomic benefit. The specific objectives 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; (c) to demonstrate the benefits of various space technology applications for priorities established by the United Nations Conference on Sustainable Development in 2012 (Rio+20); and (d) to promote the integration of space solutions into national development agendas, including building institutional and governance frameworks.

25. The Workshop focused on environmental monitoring and natural resource management, food security and agriculture, spatial data infrastructure, disaster risk reduction and emergency response, capacity-building and regional and international cooperation. There were two round-table discussions, on regional coordination and the institutional context in Latin America and the Caribbean and on capacity-building in the use of space technology for Latin America and the Caribbean, focusing on its application in different areas of the regional economy. A tutorial was organized by ISPRS to introduce in-depth case studies in air monitoring, agriculture and forestry so as to demonstrate how Earth observation could generate socioeconomic benefits. The programme also included a panel on gender equity in the space sciences, from providers to decision makers and end users.

2. Enabling space technologies

26. The United Nations/Latvia Workshop on Applications of Global Navigation Satellite Systems, hosted by the Latvian Geospatial Information Agency on behalf of the Government of Latvia, was held in Riga from 14 to 18 May 2012 (A/AC.105/1022). The Workshop was co-sponsored by the United States (through the International Committee on Global Navigation Satellite Systems (ICG)) and ESA. The specific objectives of the five-day Workshop were: (a) to provide an update on ongoing activities related to the use of GNSS technology in participating countries; (b) to identify the specific needs of ongoing individual plans and projects for GNSS at the regional and international levels for short-, medium- and long-term applications, taking into consideration local institutional settings, including specific training and capacity-building needs; and (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 or regional pilot projects in which interested institutions could incorporate the use of GNSS technology. Thus, the overarching objective was to facilitate cooperation in applying GNSS solutions through the exchange of information and scaling up of capacity in countries of the region.

27. To support the development of GNSS applications, participants recommended the compilation and maintenance of a catalogue of case studies and best practices. It was also agreed to continue the practice of an annual cumulative computation of

kinematic parameters of the different frames of reference. In addition, it was agreed to prepare the description of the models and tools necessary to manage and coordinate change over time and to propose mathematical approaches to improve management practices. Research on applying those models to geospatial data sets, for example through the use of GIS, was deemed necessary. Participants recognized that the work of ICG, in particular in establishing interoperability among global systems, would allow GNSS users to utilize one instrument to receive signals from multiple satellite systems, which would provide additional data, especially in urban and mountainous regions, and lead to greater accuracy in timing and positioning measurements.

28. The United Nations Expert Meeting on the International Space Station Benefits for Humanity was held in Vienna on 11 and 12 June 2012, during the 49th session of the Committee on the Peaceful Uses of Outer Space (A/AC.105/1024). As part of the Human Space Technology Initiative, the Expert Meeting focused on facilitating dialogue to extend the benefits of the International Space Station (ISS) to humanity. The Meeting brought together representatives and experts from the ISS partners, including NASA, the Canadian Space Agency (CSA), ESA and the Japan Aerospace Exploration Agency (JAXA), and from specialized agencies of the United Nations — the World Meteorological Organization, the United Nations Environment Programme, the World Health Organization and the United Nations Educational, Scientific and Cultural Organization, as well as the Office for Outer Space Affairs of the Secretariat. The Meeting was designed to stimulate discussion and exchange of ideas on potential synergies between the ISS partner agencies and United Nations bodies in the areas of Earth observation and disaster response, health and education.

29. In order to facilitate discussion on the various subjects, 14 concept notes were prepared prior to the meeting, 6 of them were related to Earth observation and disaster response, 2 to health and 6 to education. A subset of these concepts was identified as appropriate for information exchange consistent with the objectives of the Meeting. The concept of “space-proven telemedicine devices and services for underserved populations” was included so as to identify and transfer space-proven telemedicine applications on board the ISS to be used on Earth to benefit underserved populations. The concept of “distribution of educational materials for microgravity science and human space technology” was included with a view to translating educational materials on microgravity science and human space technology into the official languages of the United Nations and to distributing them via the United Nations network throughout the world. It was observed that further assessment of these concepts by the interested parties would be needed prior to further exploration of potential activities.

30. The United Nations/Japan Nanosatellite Symposium: “Paradigm shift — changing architecture, technologies and players” was held in Nagoya, Japan, from 10 to 13 October 2012 (A/AC.105/1032). The Symposium was the first 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.

31. Participants discussed the latest developments in the field of nanosatellite development and made recommendations related to the coordination of the frequency spectrum for small satellite missions, stressing the importance of conducting such missions in compliance with existing regulatory and legal obligations as well as with voluntary guidelines. In addition, they confirmed the workplan of the Basic Space Technology Initiative. Recommendations included setting up special working groups on frequency coordination issues and on the long-term sustainability of outer space activities, which would interact with the International Telecommunication Union (ITU) and with the relevant working and expert groups established by the Committee for Outer Space Affairs under its agenda item on the long-term sustainability of outer space activities. A special session was organized to launch the development of a curriculum on space technology engineering. Participants endorsed the approach and the multi-year schedule of work for the development of the curriculum.

3. Space science and space law

32. The United Nations/Austria Symposium on Data Analysis and Image Processing for Space Applications and Sustainable Development: Space Weather Data was held in Graz, Austria, from 18 to 21 September 2012, hosted by the Space Research Institute of the Austrian Academy of Sciences and by Joanneum Research (A/AC.105/1026). The Symposium was the first in a new series of symposiums were to be organized by the Office for Outer Space Affairs to focus on space-derived data analysis for sustainable development, to review latest data analysis and modelling techniques, and to consider any gaps or specific requirements of the user communities.

33. Major ongoing initiatives in space weather data collection and analysis were presented, updating participants on recent developments in the area and also on progress at the conclusion of the International Space Weather Initiative, followed by a one-day training session in the use of various data sources and data analysis tools. Participants made a set of recommendations, covering improved data collection and documentation, free and open access to such data, use of established standards for data provision and archiving, continued build-up and operational continuity of space weather instrumentation at the global level, as well as development and sharing of improved analysis models and tools. It was also proposed that a future symposium in the series should consider the status of space weather data collection and the availability of instruments in more detail, as well as review available models and modelling developments in analysing space weather data.

34. The United Nations/Ecuador Workshop on the International Space Weather Initiative was held in Quito from 8 to 12 October 2012 (A/AC.105/1030). The Quito Astronomical Observatory of the National Technical School of Ecuador hosted the Workshop on behalf of the Government of Ecuador. Organized by the United Nations, ESA, NASA and JAXA, the Workshop was the twentieth in a series of workshops on basic space science, the International Heliophysical Year 2007 and the International Space Weather Initiative proposed by the Committee on the Peaceful Uses of Outer Space on the basis of discussions of its Scientific and Technical Subcommittee (A/AC.105/958, paras. 162-173). The main objective of the Workshop was to provide a forum in which participants could comprehensively review the achievements of the International Space Weather

Initiative in terms of the status of deployment of low-cost, ground-based, worldwide space weather instruments and further plans for the Initiative, as well as assess recent scientific and technical findings in the field of solar-terrestrial interaction. Participants took note of the number of deployed space weather instruments, belonging to 17 instrument arrays in 98 countries or areas.

35. Participants recommended that the International Space Weather Initiative be continued in 2013 and beyond as part of the space weather agenda item of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space. Specifically, it was recommended that: (a) the Initiative continue the operation and development of existing arrays and the deployment of new instrument arrays as appropriate; (b) the Initiative undertake to examine data sets to determine data utility, to develop connections with virtual observatories so as to make data more readily available and to facilitate collaborative modelling of regions of interest (e.g. the equatorial ionosphere); (c) data from the instrument arrays of the Initiative should be combined with space-based and ground-based data to advance space weather science leading to robust research and scientific papers in international journals; (d) the Initiative and GNSS communities should collaborate in data sharing and space weather research; (e) the space science schools and the annual United Nations workshops for the Initiative should continue in future; and (f) the partnerships already established with international scientific organizations should be strengthened to assure that capacity-building activities were accomplished efficiently and for the benefit of all Member States.

36. The United Nations/Argentina Workshop on Space Law on the theme “Contribution of space law to economic and social development” was held in Buenos Aires from 5 to 8 November 2012 (A/AC.105/1037). The Workshop was the eighth in a series of space law workshops organized by the Office for Outer Space Affairs together with a host country. It was co-organized by the Office and the National Commission on Space Activities (CONAE) of Argentina and supported by ESA. The objectives were to promote understanding, acceptance and implementation of the United Nations treaties and principles relating to outer space; to promote 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.

37. During the Workshop, an overview of national regulatory frameworks of 13 States in the region was conducted, using as a basis the report of the Working Group on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space on the work conducted under its multi-year workplan (A/AC.105/C.2/101). The Workshop resulted in a set of recommendations, observations and conclusions addressing the contribution of space law to economic and social development, global governance of space activities and the role of the Committee on the Peaceful Uses of Outer Space and its subsidiary bodies in fostering international cooperation in space activities. The Workshop advocated improved synergy between the Committee and its two Subcommittees, and emphasized the role of the Principles Relating to Remote Sensing of the Earth from Outer Space (General Assembly resolution 41/65) and the Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries (resolution 51/122), as important instruments in harnessing

the use of space-derived geospatial data, supporting sustainable development policies and establishing national spatial data infrastructures. Participants suggested that a mechanism should be considered to increase awareness of developments in national legislation and collaborative mechanisms for cooperation, with the assistance of regional efforts such as those of the Space Conference of the Americas. They also emphasized the important role of the Regional Centre for Space Science and Technology Education for Latin America and the Caribbean in providing training in the interdisciplinary fields of space science, technology and law.

C. Technical advisory services and regional cooperation

38. The United Nations/International Academy of Astronautics Workshop on Small Satellites in the Service of Developing Countries, the thirteenth such joint workshop, was held in Naples, Italy, on 2 October 2012, within the framework of the 63rd International Astronautical Congress. The half-day Workshop was organized as an integral part of the Congress and was attended by some 100 of its registered participants. The meeting featured 10 technical presentations, most of them focused on the contribution that small satellites can make to support scientific, Earth observation and telecommunication missions, with emphasis placed on international cooperation, education and training, and the benefits of such programmes for developing countries.

39. The Programme provided financial support to ISPRS to organize a regional training course for experts from developing countries on the use of open-source software in the areas of image processing, GIS applications, analysis and modelling, and web mapping and publishing. The Workshop was held at the Regional Centre for Mapping of Resources for Development in Nairobi from 23 July to 3 August 2012.

40. The Programme provided advisory assistance and technical support to the University of Koblenz-Landau, Germany, to organize the International Expert Meeting on the theme “Improving public health through space technology applications: an open-community approach”, held in Bonn, Germany, from 30 July to 1 August 2012. The Meeting launched the UNISPACE III Action Team 6 follow-up initiative for an open community approach to telehealth and telemedicine and discussed the use of space technology in spatial epidemiology and spatial ecotoxicology issues. The event also tested the advantages and challenges of a low-cost meeting concept for minimizing the travel expenses of participants and speakers through extensive use of Internet-based videoconferencing technologies.

41. The Asia-Pacific Satellite Communication Council Satellite Conference and Exhibition on Leading Satellite Evolution, the 15th in the series, was held in Seoul from 24 to 28 September 2012 and gathered more than 450 professionals and leaders from the satellite industry, Governments and non-governmental organizations. The Conference focused on critical issues facing the satellite industry in the Asia-Pacific region, including new satellite application technologies, services strategies and regulatory issues.

42. ICG held its Seventh Meeting in Beijing from 5 to 9 November 2012 (A/AC.105/1035) to continue reviewing and discussing developments in GNSS and

to allow Committee members, associate members and observers to address recent developments in their organizations and associations with regard to GNSS services and applications. The Meeting also addressed GNSS professional, mass-market and scientific applications. Representatives of industry, academia and Governments shared their views on GNSS services.

43. Pursuant to the ICG workplan, the Office for Outer Space Affairs, as the Executive Secretariat of the Committee, also concentrated on promoting the use of GNSS technologies as tools for scientific applications, including space weather effects on GNSS. Funds provided by the United States through ICG were used to support the workshop on science applications of GNSS in developing countries held at the Abdus Salam International Centre for Theoretical Physics, in Trieste, Italy, from 11 April to 1 May 2012 and the technical seminar held in association with the International Federation of Surveyors (FIG) in Rome on 4 and 5 May 2012. These activities combined formal lectures with hands-on practice in GNSS basics and state-of-the-art applications, with emphasis on the scientific exploration of the Earth's environment using GNSS.

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

1. Activities of the Programme carried out in 2012

44. In 2012, two symposiums, one expert meeting and five 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 2013

45. The meetings, seminars, symposiums, training courses and workshops scheduled for 2013, 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 2011-2013

46. 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 2011-2013, are listed in annex III.

V. Voluntary contributions

47. The successful implementation of Programme activities in 2012 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.

48. The following Member States and governmental and non-governmental organizations provided support for the activities of the Programme in 2012:

(a) Austria, which, through its Federal Ministry for European and International Affairs, the State of Styria and the City of Graz, provided €56,400 to defray 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 Symposium on Data Analysis and Image Processing for Space Applications and Sustainable Development: Space Weather Data, held in Graz, Austria, from 18 to 21 September 2012 (see annex I);

(b) China, which provided \$50,000 in support of the implementation of the Human Space Technology Initiative in 2012;

(c) Japan, which provided \$40,000 towards the implementation of the Human Space Technology Initiative and co-sponsored the United Nations/Ecuador Workshop on the International Space Weather Initiative, held in Quito from 8 to 12 October 2012;

(d) The United States, which provided \$170,000 towards the implementation of the ICG workplan, focusing on information dissemination and capacity-building, and selected activities related to GNSS applications, and co-sponsored the United Nations/Ecuador Workshop on the International Space Weather Initiative, held in Quito from 8 to 12 October 2012;

(e) 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 2012 by such Governments is estimated to have amounted to approximately \$471,000;

(f) 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);

(g) ESA, which provided \$55,000 in support of activities of the Programme that it co-sponsored in 2012 (see annex I);

(h) IAF, which provided €20,000 in support of the United Nations/International Astronautical Federation Workshop on Space Technologies Applied to the Needs of Humanity: Experience from Cases in the Mediterranean Area, held in Naples, Italy, from 28 to 30 September, and also provided 25 funded participants of the Workshop with free registration at the 63rd International Astronautical Congress;

(i) Other private or public donors provided a total of \$11,000 in support of activities of the Programme in 2012.

VI. Financial provisions and administration of activities in the biennium 2012-2013

49. The activities of the Programme in 2013 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-sixth session for implementing the activities of the Programme during the biennium 2012-2013, an amount of approximately \$380,000 will be used to implement the activities of the Programme in 2013. 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: meetings, seminars, symposiums, training courses and workshops held in 2012

<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/Latvia Workshop on Applications of Global Navigation Satellite Systems Riga 14-18 May 2012	Latvia, United States of America	United Nations, European Space Agency (ESA), International Committee on Global Navigation Satellite Systems (ICG)	Latvian Geospatial Information Agency	The United Nations and co-sponsors provided full or partial financial support for 22 participants.	29	74	A/AC.105/1022
United Nations Expert Meeting on the International Space Station Benefits for Humanity Vienna 11-12 June 2012	Austria	United Nations	Office for Outer Space Affairs	The United Nations provided full or partial financial support for 13 participants.	23	38	A/AC.105/1024
United Nations/Austria Symposium on Data Analysis and Image Processing for Space Applications and Sustainable Development: Space Weather Data Graz, Austria 18-21 September 2012	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 17 participants.	23	47	A/AC.105/1026
United Nations/International Astronautical Federation Workshop on Space Technologies Applied to the Needs of Humanity: Experience from Cases in the Mediterranean Area Naples, Italy 28-30 September 2012	Italy	United Nations, International Astronautical Federation (IAF), ESA	Italian Space Agency (ASI)	The United Nations and co-sponsors provided full or partial financial support for 28 participants. IAF also waived the registration fee for the International Astronautical Congress for 25 participants.	54	105	A/AC.105/1028

<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/Ecuador Workshop on the International Space Weather Initiative Quito 8-12 October 2012	Ecuador	United Nations, ICG, Japan Aerospace Exploration Agency (JAXA), National Aeronautics and Space Administration (NASA) of the United States	Quito Astronomical Observatory of the National Technical School of Ecuador	The United Nations and co-sponsors provided full or partial financial support for 25 participants.	21	66	A/AC.105/1030
United Nations/Japan Nanosatellite Symposium: “Paradigm shift — changing architecture, technologies and players” Nagoya, Japan 10-13 October 2012	Japan	United Nations	University of Tokyo	The United Nations and co-sponsors provided full or partial financial support for 33 participants.	46	290	A/AC.105/1032
United Nations/Argentina Workshop on Space Law on the theme “Contribution of space law to economic and social development” Buenos Aires 5-8 November 2012	Argentina	United Nations, ESA	National Commission of Space Activities (CONAE) of Argentina	The United Nations and co-sponsors provided full or partial financial support for 25 participants.	20	113	A/AC.105/1037
United Nations/Chile Workshop on Space Technology Applications for Socio-Economic Benefits Santiago 12-16 November 2012	Chile	United Nations, International Society for Photogrammetry and Remote Sensing, Secure World Foundation	Centre for Information on Natural Resources (CIREN) of Chile	The United Nations and co-sponsors provided full or partial financial support for 22 participants.	32	160	A/AC.105/1036

Annex II

United Nations Programme on Space Applications: schedule of meetings, seminars, symposiums, training courses and workshops for implementation in 2013

<i>Title</i>	<i>Place and date</i>	<i>Objective</i>
United Nations/Pakistan Workshop on the Integrated Use of Space Technology for Food and Water Security	Islamabad 11-15 March 2013	To address space technologies, applications, information and services that contribute to sustainable economic and social development programmes supporting agricultural and water security, primarily in developing countries.
United Nations/Croatia Workshop on the Applications of Global Navigation Satellite Systems	Baška, Krk Island, Croatia 21-25 April 2013	To update ongoing activities related to the use of global navigation satellite systems (GNSS) technology and 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 or regional pilot projects, or both, in which interested institutions could incorporate the use of GNSS technology.
United Nations/Indonesia Workshop on Climate Change	Jakarta 2-4 September 2013	To bring together experts from the space and climate change communities as well as decision makers to discuss methods to use space-based applications to support the identification and implementation of adaptation measures, as well as to share experience and lessons learned in the use of such applications in the context of climate mitigation.
United Nations/China Workshop on Human Space Technology	Beijing 16-20 September 2013	To exchange information on achievements in the human space programme, to promote international cooperation in human space exploration-related activities, to create awareness of the benefits of human space technology and its applications, and to build capacity in microgravity science research and education, as well as to discuss how to further facilitate the Human Space Technology Initiative.
United Nations/Austria/European Space Agency Symposium on Data Analysis and Image Processing for Space Applications and Sustainable Development	Graz, Austria 17-20 September 2013	To bring together hardware and software developers and users to review the current technology for data analysis and image processing for space applications and discuss how to improve it, and to provide participants with hands-on training in state-of-the-art technology.
United Nations/International Astronautical Federation Workshop on the Benefits of Space Technology for Developing Countries	Beijing 20-22 September 2013	To exchange experience 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/United Arab Emirates Symposium on Basic Space Technology	Dubai 14-17 October 2013	To discuss opportunities, challenges and means of capacity-building and international cooperation in space technology development, in particular as related to small satellite activities under the work programme of the Basic Space Technology Initiative, and especially to advance the work on the curriculum on space technology engineering.

<i>Title</i>	<i>Place and date</i>	<i>Objective</i>
United Nations/Belarus Workshop on Space Technology Applications for Socio-Economic Benefits	Minsk 11-15 November 2013	To discuss how the use of space technology could benefit various areas, such as aviation, maritime and land transportation, urbanization, mapping and surveying, human health, disaster management, environmental monitoring and natural resource management, in order to increase awareness of the socioeconomic benefits of space technology applications at the national, regional and international levels.

Annex III

Regional centres for space science and technology education, affiliated to the United Nations: schedule of nine-month postgraduate courses, 2011-2013

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

<i>Year</i>	<i>Venue</i>	<i>Activity</i>
2011-2012	Indian Institute of Remote Sensing, Dehra Dun, India	Sixteenth Postgraduate Course on Remote Sensing and Geographic Information Systems
2011-2012	Space Applications Centre, Ahmedabad, India	Eighth Postgraduate Course on Satellite Communications
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

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

<i>Year</i>	<i>Venue</i>	<i>Activity</i>
2011-2012	Mohammadia School of Engineers, University of Mohamed V, Agdal, Rabat	Eighth Postgraduate Course on Remote Sensing and Geographic Information Systems
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

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

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

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

<i>Year</i>	<i>Venue</i>	<i>Activity</i>
2011	National Institute for Space Research, Santa Maria, Rio Grande do Sul, Brazil	Ninth Postgraduate Course on Remote Sensing and Geographic Information Systems
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	National Institute of Astrophysics, Optics and Electronics, Tonantzintla, Puebla, Mexico	Sixth Postgraduate Course on Satellite Communications

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

<i>Year</i>	<i>Venue</i>	<i>Activity</i>
2013	Royal Jordanian Geographic Centre	The first courses are expected to start in 2013.