25 March 2011

English only

Committee on the Peaceful Uses of Outer Space
Legal Subcommittee
Fiftieth session
Vienna, 28 March-8 April 2011

Draft Contribution of the Committee on the Peaceful Uses of Outer Space to the United Nations Conference on Sustainable Development (UNCSD)

Harnessing space-derived geospatial data for sustainable development

Note by the Secretariat

Contents

V.11-81701 (E)

I. Introduction

1. In its resolution 65/97 of 10 December 2010, the General Assembly expressed its conviction that the use of space science and technology and their applications in areas such as telemedicine, tele-education, disaster management, environmental protection and other Earth observation applications contribute to achieving the objectives of the global conferences of the United Nations that address various aspects of economic, social and cultural development, particularly poverty eradication.

2. The Assembly in its resolution invited the Committee on the Peaceful Uses of Outer Space to consider how it could contribute to the objectives of the United Nations Conference on Sustainable Development, to be held in Rio de Janeiro, Brazil, in 2012.

3. The objective of the Conference is to secure renewed political commitment for sustainable development, assessing the progress to date and the remaining gaps in the implementation of the outcomes of the major summits on sustainable development and addressing new and emerging challenges. To this end, the focus is on two themes: a) a green economy in the context of sustainable development and poverty eradication; and b) the institutional framework for sustainable development.

4. The Committee has identified the use of space-derived geospatial data as an overarching theme for its contribution to the objectives of the Conference. The institutional framework for governance of international cooperation in the peaceful uses of outer space constitutes an important mechanism for strengthening efforts at all levels to harness geospatial data for sustainable development.

5. The present report endeavours to explain the increasing role of space-derived geospatial data in sustainable development. Recommendations are presented on ways and means to foster international cooperation with a view to building up national infrastructures to use such data.

II. Benefits of space-based data in sustainable development

6. Space science and technology and their applications can play an important role in achieving the objectives of the World Summit on Sustainable Development, and could contribute more efficiently to the efforts of humankind to promote sustainable development in all countries and regions of the world. Information obtained from space-derived geospatial data is providing essential inputs for decision making in topics such as disaster management and emergency response.

7. The term geospatial data is defined to describe any data with explicit geographic positioning information. The term space-derived geospatial data refers to geospatial data obtained from space-based platforms. The potential value of such data for use in a wide range of applications had been predicted even prior to the beginning of the space age and was confirmed following the successful launch and operation of the first remote sensing satellites.

8. Geospatial data from remote sensing of planet Earth from space is a rapidly growing and maturing technology and operationally integrated with other

disciplines such as photogrammetry, cartography, geodetic reference systems, global navigation satellite systems, and geographic information systems.

9. In monitoring the Earth and its environment, satellites can provide the synoptic, continuous and long-term global observation needed to understand the Earth system more comprehensively, in conjunction with the use of modelling technology to address issues such as: (a) the influence of the Sun on the Earth's environment; (b) global climate change; (c) changes in the ozone layer; (d) the impact of human activities on the environment; and (e) global health.

10. While the value of Earth observation images in the preparation of risk maps and mitigation of the effects of disasters has been recognized and is being used to some extent, satellites are increasingly providing important information for early warning and management of natural or industrial disasters events when they occur.

11. Space technologies provide valuable data for weather forecasting, climate predictions, monitoring of natural resources and for various activities related to agriculture, and management of land and marine resources. In addition, satellite data is improving the prediction of rainfall using well-developed rainfall estimation techniques. The information derived from such prediction would be very useful for crop and flood forecasting. Especially in Africa, the increased use of satellite images would greatly assist in the early detection of army worm and locust breeding areas, as well as drought prediction and desertification monitoring.

12. Information and communication infrastructure is an essential component of development in any country, and space technology is a central tool to gather information and to communicate it rapidly and efficiently globally, and in particular in remote areas. In addition to Earth observation systems, wide-ranging applications include distance learning and telemedicine, providing essential health and medical services and assisting in enhancing education opportunities, in particular in rural and remote areas.

13. Satellite communications are becoming essential in disaster mitigation and relief operations. Their use is vital in situations where ground-based infrastructure becomes unusable. Global navigation satellite systems (GNSS) offer public services that have numerous applications. The signals from GNSS are being used to enhance the safety and effectiveness of transportation by land, sea and air. With their extremely high accuracy, global coverage, all-weather capability and usefulness at high velocity, GNSS applications also support and improve a wide range of activities, such as telecommunications, power systems, mapping and surveying, agriculture, crime prevention and law enforcement, as well as emergency response and disaster reduction.

III. Governance of international cooperation in the peaceful uses of outer space

14. The Committee on the Peaceful Uses of Outer Space is the primary United Nations body for coordinating and achieving international cooperation in space activities. The Committee and its subsidiary bodies, the Scientific and Technical Subcommittee and Legal Subcommittee, through their agendas, promote

international cooperation in the peaceful uses of outer space for economic, social and scientific development, in particular for the benefit of developing countries.

15. The Committee evolved as a result of the recognition, by the General Assembly in its resolution 1348 (XIII) of 13 December 1958, of the importance of using outer space exclusively for peaceful purposes and of the need to promote international cooperation in the conduct of space activities, and in 1959 the General Assembly, through its resolution 1472 A (XIV) of 12 December 1959, established the permanent Committee and of its Legal Subcommittee and its Scientific and Technical Subcommittee.

16. The overall mandate of the Committee and its subsidiary bodies aims at strengthening the international legal regime governing outer space, resulting in improved conditions for expanding international cooperation in the peaceful uses of outer space, and supporting efforts at the national, regional and global levels, including those of entities of the United Nations system and international space-related entities, to maximize the benefits of the use of space science and technology and their applications, and to increase coherence and synergy in international cooperation in space activities at all levels.

17. Another central element in the work of the Committee is to further strengthen capacity, particularly of developing countries, in the use and applications of space science and technology for sustainable development and increasing awareness of decision makers of the benefits of space science and technology and their applications to address societal needs for sustainable development through international cooperation among Member States and national and international space-related entities, including the private sector as appropriate.

18. The Committee has been instrumental in the development of the legal regime governing activities in outer space for peaceful purposes, by establishing the five space law treaties and the five principles and declarations on outer space. The fundamental principles laid down in the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty) have been further manifested by the subsequent treaties and set of principles and declarations adopted by the General Assembly.

19. With regard to the use of space-derived geospatial data, the 1986 Principles Relating to Remote Sensing of the Earth from OuterSpace (Remote Sensing Principles) should be specifically noted, as well as the 1996 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 (Benefits Declaration).

20. The Committee, in its effort to strengthen the overarching institutional framework for governance of international cooperation in the peaceful uses of outer space established in 2006 the International Committee for Global Navigation Satellite Systems (ICG) and the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER).

21. The General Assembly in its resolution 65/97 emphasizes that regional and interregional cooperation in the field of space activities is essential to strengthen the peaceful uses of outer space, assist States in the development of their space

capabilities and contribute to the achievement of the goals of the United Nations Millennium Declaration and to that end fosters interregional dialogue on space matters between Member States.

22. To that end, the Committee has a strong relationship with regional and interregional intergovernmental entities and mechanism for coordination and cooperation in space activities, such as the Asia Pacific Space Cooperation Organization (APSCO), the Asia-Pacific Regional Space Agency Forum (APRSAF), the African Leadership Conference on Space Science and Technology for Sustainable Development (ALC), and the Space Conference of the Americas.

IV. UNISPACE III and the contributions made to the multi-year work of the Commission on Sustainable Development (2006-2011)

23. On 20 October 2004, the General Assembly conducted a five-year review of the progress made in the implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III). The Assembly had before it the report of the Committee on the Peaceful Uses of Outer Space on the implementation of the recommendations of UNISPACE (A/59/174), in which the Committee reviewed the mechanisms for and progress made in implementing the recommendations, identified synergies between the implementation of those recommendations and the results of global conferences held within the United Nations system and other global initiatives and proposed a plan of action for further implementing the recommendations of UNISPACE III.

24. The report of the Committee provides a road map for the further development of space capabilities to advance human development, in making space tools more widely available by moving from the demonstration of the usefulness of space technology to a more broadly based operational use of space-based services. The Plan of Action, contained in that report, constitutes a long-term strategy for enhancing mechanisms at the national, regional and global levels in developing and strengthening the use of space science and technology and their applications to support overarching global agendas for sustainable development; developing coordinated, global space capabilities; supporting specific agendas to meet human development needs at the global level; and supporting overarching capacity development.

25. The Committee, in the report (A/59/174, para. 227), noted that in implementing the Plan of Action, it could provide a bridge between users and potential providers of space-based development and services by identifying needs of Member States and coordinating international cooperation to facilitate access to the scientific and technical systems that might meet them, while observing the interaction between different stakeholders in the future implementation of the strategy and building upon the respective roles and needs of actors involved in the wider space community.

26. In its resolution 59/2 of 20 October 2004, the Assembly endorsed the Plan of Action proposed by the Committee in its report, and requested the Committee to

examine the contribution that could be made by space science and technology and their applications to one or more of the issues selected by the Commission on Sustainable Development as a thematic cluster and to provide substantive inputs for consideration by the Commission.

27. The contribution of the Committee on the Peaceful Uses of Outer Space to the work of the Commission on Sustainable Development for the thematic cluster 2006-2007 was described in document A/AC.105/872 of 9 March 2006, its contribution to the thematic cluster 2008-2009 was described in document A/AC.105/892 of 13 July 2007, and its contribution to the thematic cluster 2010-2011 was described in document A/AC.105/944 of 1 July 2009. Those documents contained information about and highlighted the benefits of space science and technology and their applications with regard to the thematic clusters being addressed by the Commission in those periods.

28. The thematic areas addressed by the Committee during the period 2006-2011, addressed in detail in the reports referred to in paragraph 4 above, include considerations on the use of space science and technology applications for improving efficiency in energy; promoting industrial development; combating air pollution; addressing climate change and the role of space applications in agriculture, land use and rural development; preventing drought and desertification; enhancing transport networks; and using space technology for sustainable resource management, consumption and production. Cross-cutting areas identified by the Commission on Sustainable Development were also addressed, such as sustainable development in Africa and capacity-building and training opportunities for developing countries.

29. Paramount to the strategy for implementing the recommendations of UNISPACE III and contributing to the work of the Commission on Sustainable Development was the need to take into account the results of the global conferences held within the United Nations system in the 1990s that had identified priorities for promoting human development, as well as the goals and objectives of the conferences held since UNISPACE III, in particular the Millennium Summit, held in New York from 6 to 8 September 2000, and the World Summit on Sustainable Development, held in Johannesburg, South Africa, from 26 August to 4 September 2002.

30. The General Assembly in its resolution 65/97 notes with satisfaction that a number of the recommendations set out in the Plan of Action have been implemented and that satisfactory progress is being made in implementing the outstanding recommendations, and that Member States continue to contribute to the implementation of the recommendations of UNISPACE III through national and regional activities and by supporting and participating in the programmes established in response to those recommendations.

V. Harnessing space-derived geospatial data for sustainable development

31. The Committee on the Peaceful Uses of Outer Space and its Subsidiary bodies regularly consider, through their established agendas, items related to the use of

space-based geospatial data and assess developments at national, regional and international levels.

32. National spatial data infrastructures and related national geo-information policies have been established in several Member States, and a growing number of countries are actively developing and deploying their own remote-sensing satellite systems and utilizing space-based data to advance socio-economic development. There is also an increasing convergence of space-based data, geographic information systems and GNSS technologies generating valuable information for policy- and decision-making.

33. While the benefits of space-derived geospatial data are widely known, there is still a need to enhance capacities in many countries to ensure that such data can be exploited to the fullest extent possible. The increased availability of space-based data at little or no cost, including those provided by the Argentine Earth observation satellite SAC-C, the China-Brazil Earth resources satellites, the Greenhouse Gases Observing Satellite of Japan and the United States Landsat image archive, is an important factor in this regard.

34. Global open-data access policies provide access to geospatial data either free of charge or at a nominal cost. For example, the United States Geological Survey (USGS) provides the international community, free of charge, with electronic access to all Landsat scenes held in the USGS-managed national archive of global scenes dating back to Landsat-1, launched in 1972. There are several other ongoing or planned satellite missions which plan to disseminate their data sets in accordance with open-data access policies.

35. Initiatives and programmes undertaken within regional and international frameworks such as APSCO, APRSAF, ALC, the Space Conference of the Americas, CEOS, GEO, and through the Global Monitoring for Environment and Security (GMES), are promoting international cooperation in the use of remote sensing technology. Recent developments include the setting up of an African Resources and environmental Management satellite Constellation (ARMC).

36. A number of national, regional and global initiatives, including activities under the framework of GEO, are addressing issues related to the consolidation of spatial data infrastructures which can support sustainable development, in particular, the following initiatives: (a) the establishment of the Centre of Excellence for the United Nations Spatial Data Infrastructure (UNSDI) under the auspices of the Office for Information and Communication Technology of the Secretariat of the United Nations; (b) the agreement on data sharing principles within the framework of the Group on Earth Observation, and; (c) the United Nations led initiative on Global Geospatial Information Management.

37. GEONETCast, a near real-time, near-global, satellite-based environmental information delivery system, has significant potential to address bottlenecks in data dissemination. Through the use of low-cost receiving stations it can enhance access to a wide range of information and reach users in developing countries with limited or no access to high-speed Internet connections.

38. The work of CEOS is now fully integrated into the Group on Earth Observations (GEO), where CEOS is responsible for the space-based aspects of the Global Earth Observation System of Systems (GEOSS). In support of GEOSS

CEOS has developed the concept of virtual, space-based Constellations that focus on the observation of particular parameters. CEOS is also known for the publication and updating of the Earth Observation Handbook, a comprehensive database of Earth Observation missions and sensors.

39. Several United Nations entities are routinely using space-derived geospatial data which constitute a vital source of essential information for a wide range of mandated activities. To facilitate the coordination and exchange of experiences related to the use of space-derived geospatial data, United Nations entities are using the framework of the annual United Nations Inter-Agency Meeting on Outer Space Activities and of the United Nations Geographic Information Working Group (UNGIWG).

40. The Second Administrative Level Boundaries data set project (SALB), launched in 2001 in the context of the activities of UNGIWG is providing access to a working platform for the collection, management, visualization and sharing of sub-national data and information in a seamless way from the national to the global level. The project involves the United Nations Economic Commission for Africa (UNECA), the United Nations Economic Commission for Latin America and the Caribbean (UNECLAC), the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), the World Health Organization (WHO), and the Asian Institute for Technology (AIT).

41. The Office for Outer Space Affairs of the Secretariat, through the United Nations Programme on Space Applications, organizes meetings to provide unique opportunities for bringing together experts in space science and technology, decision-makers and practitioners to share their experiences and knowledge with the aim to use geospatial data as widely as possible for sustainable development. Capacity building, through long-term education is specifically provided by the Regional Centres for Space Science and Technology Education, affiliated to the United Nations, located in Brazil/Mexico, India, Morocco, and Nigeria. All Regional Centres are holding nine-month postgraduate courses in satellite remote sensing and satellite meteorology, utilizing geospatial data for training, education, application, and research purposes.

42. The United Nations General Assembly in its resolution on “International cooperation on humanitarian assistance in the field of natural disasters, from relief to development” (A/RES/64/251) stated that the further use of space-based and ground-based remote sensing technologies, as provided by UN-SPIDER, should be encouraged. In the implementation of its mandate, UN-SPIDER conducts programme activities related to knowledge management, horizontal cooperation, capacity building and technical advisory support to ensure that the access to and use of space-based technology and geospatial information for disaster risk reduction and emergency response is being further improved. In addition, the UN-SPIDER programme works through an international network of Regional Support Offices and National Focal Points. By taking advantage of this expert network and close end-user interaction, UN-SPIDER significantly adds to the aim of harnessing geospatial data for sustainable development, in particular by supporting disaster resilience and emergency relief efforts.

VI. Recommendations on ways and means to foster international cooperation with a view to building up national infrastructures to use space-derived geospatial data

43. The Committee recognizes the value and the importance of geospatial data, including in particular those provided by satellites systems, for the purpose of supporting sustainable development policies, and considers that space-derived geospatial data constitute a resource that could be managed at a local, national, regional or global level, notably through the establishment of dedicated national spatial data infrastructures.

44. The Committee also emphasizes that the establishment of such national spatial data infrastructures, together with the appropriate training and education, could serve the purposes of supporting development policies in countries which would benefit from a larger use of geospatial data in their policies, notably in the fields of environment protection, land resources management, agriculture, urbanism, disaster prevention and monitoring, early warning systems, and others.

45. In order to foster international cooperation in building up national infrastructures to use geospatial data, the Committee recommends that:

(a) In their international cooperation with developing countries, States should consider the need, the suitability and the feasibility of strengthening the use of space-derived geospatial data, notably through the establishment of a national spatial data infrastructure in the said developing country;

(b) States which hold the expertise in the establishment, the operation and/or the maintenance of space-derived geospatial infrastructures, databases, or in the use and exploitation of space-derived geospatial data for the purpose of supporting local, national, regional or global governmental policies, should assist those countries wishing to develop their own capacity and expertise in the use of space-derived geospatial data, on a voluntary basis;

(c) Such cooperation effort could be organized and performed in the framework of general or ad hoc agreements or arrangements at the governmental level or at the institutional level;

(d) In addition to the above-mentioned aspects, States should pay particular attention to the creation at the national level of the adequate conditions required for the establishment of national spatial data infrastructures;

(e) States should employ efforts in capacity building, including short-term and long-term training, development of associated infrastructure and institutional arrangements with the purpose of enhancing autonomous national capabilities to generate information for decision- and policy-making processes;

(f) In building up national infrastructures to use space-derived geospatial data for sustainable development, States should act in accordance with the Principles relating to Remote Sensing of the Earth from Outer Space, as adopted on 3 December 1986 (General Assembly resolution 41/65), as well as with 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, as adopted on 13 December 1996 (General Assembly resolution 51/122);

(g) In assessing the need and/or the suitability of establishing a national spatial data infrastructure, States should consider several criteria, such as non-redundancy of the infrastructure regarding other accessible sources of data, long-term sustainability of the maintenance and the exploitation of the infrastructure or the actual interface between the national spatial data infrastructure and the rest of the State's agents in charge of defining, approving, funding and implementing the policies for the purpose of which the data is used;

(h) States should make best efforts to enhance visibility of existing channels through which space-derived geospatial data and related tools are available at low cost or free of charge;

(i) States should make special efforts to engage in or to expand international cooperation initiatives that aim at retrieving, classifying and sharing spatial data from remote sensing sources, ground data acquired to facilitate analysis of remotely sensed data, digital maps from specific studies carried out abroad and other relevant data;

(j) States are encouraged to participate in and benefit from existing international initiatives dealing with space-derived geospatial data, such as the Group on Earth Observation (GEO) and the Global Spatial Data Infrastructure Association (GSDI);

(k) States should continue to support the United Nations in its efforts to access and use geospatial information in its mandated programmes to assist all Member States, including through the United Nations Geographic Information Working Group (UNGIWG), in the development and maintenance of the United Nations Spatial Data Infrastructure (UNSDI) and in the work carried out by the United Nations led Initiative of Global Geospatial Information Management.