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**Committee on the Peaceful
Uses of Outer Space
Scientific and Technical Subcommittee
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Item 5 of the draft provisional agenda*
Implementation of the recommendations of
UNISPACE III**

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

Harnessing geospatial data for sustainable development

Note by the Secretariat

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* A/AC.105/C.1/L.306.



I. UNISPACE III and contributions of the Committee to the multi-year work of the Commission on Sustainable Development

1. In its resolution 65/97 of 10 December 2010, the General Assembly invited the Committee 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.

II. Space benefits for sustainable development

7. The Committee believes that 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.

8. 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) human health.

9. Satellites also enable the systematic observation of the Earth system, which is essential in monitoring the implementation of existing environmental conventions such as the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity and the United Nations Convention to Combat Desertification.

10. While the value of Earth observation images in the preparation of risk maps and mitigation of the effects of disasters has been recognized to some extent, satellites are increasingly providing important information for early warning and management of natural or industrial disasters 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 potent 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. 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. Harnessing geospatial data for sustainable development

13. 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.

14. Today, the use of space-derived geospatial data has become indispensable for a steadily growing number of applications which address issues of sustainable development. This development is in part resulting from improved operational capabilities and by the increasing sophistication of space-based platforms and modern information processing systems which contribute to making space-derived geospatial data more easily accessible. The use of timely and high-quality space-derived geospatial data for sustainable development in application areas such as agriculture, deforestation assessment, disaster monitoring, drought relief and land use management can yield significant societal benefits.

15. 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. Several member States and non-governmental organizations are contributing to such capacity-building activities.

16. National spatial data infrastructures and related national geo-information policies have been established in several Member States. A number of national, regional and global initiatives, including activities under the framework of GEO, are addressing issues related to the use of space-derived geospatial data for sustainable development. In particular, the Committee notes the following initiatives: (a) the Working Group on Information Systems and Services (WGISS) of CEOS is contributing to efforts to enhance international collaboration and to advocate and promote technologies that enable the search of and access to the data and services needed to support scientists, application providers and decision makers; (b) the Global Spatial Data Infrastructure (GSDI) Association is the umbrella organization through which the international community is sharing experience in the development of spatial data infrastructure, and its small grants programme has directly benefited many African countries; and (c) the Mesoamerican Regional Visualization and Monitoring System (SERVIR), based in Panama City, is providing support to monitoring the environment, improving land use and agricultural

practices and assisting local officials in responding faster to natural disasters. Following the success of the SERVIR project in Central America, an African node is being established in Nairobi and a similar node is being implemented in Nepal.

17. A number of organizations at the regional and global levels, such as CEOS (through its Working Group on Information Systems and Services), the European Umbrella Organisation for Geographic Information, GEO and the Global Spatial Data Infrastructure Association, contribute to capacity-building and to the coordination and promotion of activities related to the use of space-derived geospatial data.

18. 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. Since February 2009, any archive scene selected by a user is automatically processed to make it a standard product and prepared for electronic retrieval. There are several other ongoing or planned satellite missions which plan to disseminate their data sets in accordance with open-data access policies.

19. GEONETCast, a near real-time, near-global, satellite-based environmental information delivery system, developed within the framework of GEO, 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.

20. 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).

21. The activities being carried out by UNGIWG, currently co-chaired by the Office for Outer Space Affairs and the Economic Commission for Africa, address common geospatial issues in the United Nations system and work towards implementation of the United Nations Spatial Data Infrastructure (UNSDI) as a comprehensive, decentralized geospatial information framework that facilitates decision-making at various levels by enabling access, retrieval and dissemination of geospatial data and information in a rapid and secure way. This effort is closely coordinated with the United Nations Reform Agenda to ensure that it is complementary with other initiatives geared at enhancing system coherence and harmonization of business practices. National coordination offices for UNSDI have been established by the Czech Republic, Hungary, the Netherlands and Spain.

22. The United Nations is obtaining space-derived geospatial data through contractual purchase arrangements with commercial Earth Observation operators as well as in the form of in-kind contributions. The processing of space-derived geospatial data for maps and other products is partially conducted by experts of United Nations entities, such as in the Department of Field Support (DFS), the

United Nations High Commissioner for Refugees (UNHCR), the World Health Organization (WHO), the Office for the Coordination of Humanitarian Affairs (OCHA) and the UNITAR Operational Satellite Applications Programme (UNOSAT). Processed data and information are then shared among United Nations entities and made available, through websites such as ReliefWeb, a global hub for time-critical humanitarian information on Complex Emergencies and Natural Disasters. The United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) contributes to capacity-building in the use of space-derived geospatial data in disaster-related situations.

23. United Nations organizations such as the Department of Peacekeeping Operations (DPKO) and DFS are actively developing or participating in international projects to develop valuable large-scale digital geospatial databases with the purpose of making accurate and large-scale topographic map products available for operational purposes. The United Nations Environment Programme (UNEP) and the Food and Agriculture Organization (FAO) are extensively using space-derived geospatial data for environmental monitoring, resources management, and biodiversity assessments.

24. 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), the United Nations Map Library and the Asian Institute for Technology (AIT).

25. WMO, through the space-based component of the WMO Global Observing system, in cooperation with the Coordination Group for Meteorological Satellites (CGMS), is coordinating the planning and implementation of satellite missions contributing to the Global Observing System in support of meteorology, climate monitoring, hydrology, and related applications such as agriculture, aeronautics, maritime transportation, oceanic applications, disaster management, and resource and environment monitoring. A number of operational satellite operators and space agencies are participating in this global system.

26. The Office for Outer Space Affairs, through its United Nations Programme on Space Applications, in close cooperation with Member States and relevant international and regional governmental and non-governmental organizations, is contributing to capacity building efforts targeting the use of space-derived geospatial data. Specialized courses are held at the Regional Centres for Space Science and Technology Education, affiliated to the United Nations. An education curriculum on remote sensing and geographic information systems has been developed for use in the Regional Centres and in other educational institutions.

27. In the UNGIWG context, significant efforts are being made by the United Nations system to better coordinate with other relevant international bodies, such as CEOS and GEO, especially in the area of data sharing, open data access policies, and web-based applications to improve the sharing of space-based data and derived geospatial datasets.

28. UNGIWG and several individual United Nations organizations have already established specific operational needs for global core geospatial datasets. They are aware of serious gaps that still exist in the availability of accurate and up-to-date data and are therefore supporting new global initiatives to further improve the availability of such geospatial data, such as through accelerated new data extraction methods making use of space-derived imagery. A specific example is the Global Roads Database project, implemented by the Center for International Earth Science Information Network (CIESIN) at Columbia University in the United States under the auspices of Committee on Data for Science and Technology (CODATA), a Committee of the International Council for Science (ICSU). The project is using the UNSDI transportation data model and provides data for one of the most essential core datasets for United Nations activities.

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

29. 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.

30. 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.

31. 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) and the United Nations Spatial Data Infrastructure (UNSDI).