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COMMITTEE ON THE PEACEFUL USES OF
OUTER SPACE

Scientific and Technical Subcommittee

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Agenda item 5

Implementation of the
recommendations of UNISPACE III

Draft text for the Committee's contribution to the work of the Commission on Sustainable Development for the thematic cluster 2008-2009

The Committee on the Peaceful Uses of Outer Space, at its forty-ninth session, in 2006, agreed that the Scientific and Technical Subcommittee, at its forty-fourth session, should conduct the first review of a concise document to be prepared on the basis of inputs received from member States of the Committee. The Committee agreed to finalize, at its fiftieth session, in 2007, its contribution to the thematic cluster for the cycle 2008-2009 of the Commission on Sustainable Development.

The thematic cluster for the two-year cycle 2008-2009 will address the following topics: agriculture; rural development; land; drought; desertification; and Africa.

In addition to the thematic clusters, the following cross-cutting issues are addressed throughout the whole period 2004-2017 of the multi-year programme of work of the Commission: Poverty eradication; changing unsustainable patterns of consumption and production; protecting and managing the natural resource base of economic and social development; sustainable development in globalizing world; health and sustainable development; sustainable development of small island developing States; sustainable development in Africa; other regional initiatives; means of implementation; institutional framework for sustainable development; gender equality; and education.

The draft text contained in the annex to this document is prepared on the basis of inputs received from member States (A/AC.105/C.1/2007/CRP.7), and other sources, in particular the report of the Expert on Space Applications (A/AC.105/874) and the Secretary General report on the coordination of space activities within the United Nations system (A/AC.105/886). The Subcommittee is invited to review the draft text and to provide guidance to the further development of its structure, content and overall balance, in order for the Committee to finalize the document at its fiftieth session.

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Annex

Draft text for the Committee's contribution to the work of the Commission on Sustainable Development for the thematic cluster 2008-2009

Space for sustainable development

I. Introduction

1. 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 (A/59/174), in which the Committee reviewed the mechanisms for and progress made in implementing the recommendations, identified synergies between the implementation of the recommendations of UNISPACE III 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. In its resolution 59/2 of 20 October 2004, the General Assembly endorsed the Plan of Action as 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.

2. Paramount in the strategy for implementing the recommendations of UNISPACE III was the need to take into account the results of the global conferences held by the United Nations in the 1990s that identified priorities for promoting human development, as well as the goals and objectives of the conferences held since UNISPACE III, in particular the United Nations Millennium Summit and the World Summit on Sustainable Development.

3. The Committee on the Peaceful Uses of Outer Space contributed to the work of the Commission on Sustainable Development as contained in document A/AC.105/872 of 9 March 2006. The document informed about and highlighted the benefits of space science and technology and their applications with regard to the thematic cluster being addressed by the Commission in 2006 and 2007. In preparing its contribution, the Committee took into account the discussion paper submitted by the scientific and technological community entitled "Overview of recent scientific and technological developments in the fields of energy for sustainable development, air pollution/atmosphere and climate change" (see document E/CN.17/2006/5/Add.8).

4. In its resolution 61/111 of 14 December 2006, the General Assembly noted with satisfaction that the Committee established a closer link between its work to implement the recommendations of UNISPACE III and the work of the Commission on Sustainable Development by contributing to the thematic areas that are addressed by the Commission.

5. In the same resolution, the General Assembly agreed that the Director of the Division for Sustainable Development of the Department of Economic and Social Affairs of the Secretariat should be invited to participate in the sessions of the Committee to inform it how it could best contribute to the work of the Commission and that the Director of the Office for Outer Space Affairs of the Secretariat should participate in the sessions of the Commission on Sustainable Development to raise awareness and promote the benefits of space science and technology for sustainable development.

II. Space contributions to thematic cluster 2008-2009

6. Space technology and its applications, such as Earth observation systems, meteorological satellites, satellite communications and satellite navigation and positioning systems, strongly support the implementation of actions called for by the World Summit on Sustainable Development and can make a significant contribution to the thematic cluster and cross-cutting issues being addressed by the Commission in 2008 and 2009.

7. Space applications are effective tools for monitoring and conducting assessments of the environment, managing the use of natural resources, providing early warnings and managing natural disasters, providing education and health services to rural and remote areas and connecting people around the world. They are multifaceted and often offer, with a single instrument or application, the means for States to make development decisions with regard to distinct yet cross-cutting issues, as will be illustrated with information provided below on each of the themes of the cluster to be reviewed.

8. As a result of the implementation of the recommendations of UNISPACE III, the General Assembly, in its resolution 61/110 of 14 December 2006, decided to establish a United Nations Platform for Space-based Information for Disaster Management and Emergency Response (SPIDER), implemented as a programme of the Office for Outer Space Affairs under the Director of the Office, as an open network of providers of disaster management support.

9. The SPIDER programme shall provide universal access to all countries and all relevant international and regional organizations to all types of space-based information and services relevant to disaster management to support the full disaster management cycle by being a gateway to space information for disaster management support, serving as a bridge to connect the disaster management and space communities and being a facilitator of capacity-building and institutional strengthening, in particular for developing countries. In order to avoid duplication, the programme shall work closely with international initiatives aimed at utilizing space-based disaster information, such as the Integrated Global Observing Strategy Partnership (IGOS-P), the Global Earth Observation System of Systems (GEOSS), the International Charter on Space and Major Disasters and the International Strategy for Disaster Reduction.

10. In its resolution 61/111 of 14 December 2006, the General Assembly noted with appreciation that the International Committee on Global Navigation Satellite Systems (ICG) was established on a voluntary basis as an informal body to promote cooperation, as appropriate, on matters of mutual interest related to civil satellite-based positioning, navigation, timing and value-added services, as well as the compatibility and interoperability of global navigation satellite systems, while increasing their use to support sustainable development, particularly in developing countries. The establishment of the ICG was another result of the implementation of the recommendations of UNISPACE III. The ICG held its first meeting in Vienna, from 1-2 November 2006, and the report of the meeting is contained in document A/AC.105/879.

11. The Office for Outer Space Affairs is continuously updating a list of space-related initiatives and programmes carried out by member States of the Committee on the Peaceful Uses of Outer Space and within the United Nations system that respond to specific recommendations contained in the Johannesburg Plan of Implementation of the World Summit on Sustainable Development (WSSD), which is accessible through the website for the United Nations Coordination of Outer Space Activities <http://www.uncosa.unvienna.org/uncosa/en/wssd/index.html>.

12. In its report A/AC.105/872, on 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, the Committee reported on capacity-building and training opportunities for developing countries in space science and technology and their applications, in particular activities carried out under the United Nations Programme on Space Applications, including the regional centres for space science and technology education, affiliated to the United Nations.

Activities carried out under the Programme that relate to the thematic cluster 2008-2009, are reflected below.

A. The role of space in agriculture

13. United Nations entities and programmes, such as FAO, UNEP and WFP collaborates with various governmental and non-governmental entities to strengthen food security information management systems.

14. Effective use of existing Earth observation information provides tools that enhance the collection, storage, analysis and dissemination of food security information. Remote sensing data, in combination with data gathered in the field, is essential for carrying out comprehensive studies on food security and vulnerability. Satellite systems, such as Landsat and SPOT, IRS and radar sensors such as those on ENVISAT and Radarsat satellites are used.

15. Monitoring agricultural crop development from space can help predict an area's agricultural output well in advance. This information is often crucial in helping authorities to anticipate food shortage and famine, giving them enough lead time to take preventive action. Monitoring and forecasting weather by satellites are of crucial importance to farmers. Satellites are an important complement to the ground-based weather stations for predicting storms, flooding and frost. Rainfall and evapotranspiration assessment from satellites help farmers plan the timing and amount of irrigation for their crops. Such assessments can also contribute to improving food security.

16. Satellites can detect, through environmental factors, areas at risk from, or already affected by, pests like locusts, crop and livestock diseases, tsetse fly activity and animal trypanosomiasis. Available high-resolution satellite remote sensing data combined with GNSS data contribute to the development of precision farming techniques that allow monitoring crops on individual farms. These techniques help to identify precise areas under stress due to lack of water, in need of fertilizer or affected by disease. Accurate targeting of such areas helps optimal distribution of water and fertilizers, that not only improve crop yields but also saves money and reduces the environmental impact of agricultural activities.

17. Radar imagery is particularly useful in the regions where cloud cover may obscure the land surface. Synthetic Aperture Radar (SAR) data, for instance, are used to measure increased growing season length in boreal regions as an indicator of global warming; to monitor the extent and frequency of wildfires in boreal regions to better understand the role of biomass burning in the global carbon cycle; to monitor wetlands, which play a key role in greenhouse gas emissions; and to estimate the biomass of several crops. Multi-temporal SAR data offer valuable information to determine at the earliest stage of crop season, when and where fields are prepared, and later, the phenological crop's status such as flowering, ripening, plant drying and harvesting.

B. The use of space in land use and for rural development

18. It is widely recognized that important factors affecting the development in rural areas are land use and infrastructures. Accurate land use data at the right spatial resolution is a primary source of information for decision makers. The wide coverage of space by remote sensor products is a positive characteristic which helps investigators and users of the information to produce land use and cover maps as a first step in different applications. Among other things, these data are used to establish rural land registers which also help to identify the capabilities and limitations of these land zones.

19. Land use products are generated by Earth surface classification methods, which today is an automated process that can gain many benefits by SAR images. SAR technology is associated with the automatic urban areas detection algorithms, allowing e.g. the study of the change in the urban vs. rural extension or the analysis of urban-rural linkages (cities serve as input and output markets for the rural sector and are important conduits for the transfer of agricultural technology).

20. Low resolution satellite data, e.g. MODIS, AVHRR and other ancillary data (precipitation and temperature data, climatic map, land use map, topographic and soil map, life zone map, vegetation map historical record of drought etc.) are useful to develop the prospective and make recommendations for appropriate and effective interventions for sustainable land management. Satellite imagery can be used to make an inventory of previous landslides and to collect data on relevant parameters involved such as involving soil, geology, slope, geomorphology, land use, hydrology, faults, etc. The selection of the most adequate high resolution satellite data (Landsat TM, SPOT etc.) is essential in extracting land-surface information.

21. The use of satellite communications also makes it possible to provide high-quality and inexpensive health services and medical care to underprivileged people. Similar results and benefits are available for education. Road growth in rural areas is still a key factor for development of such regions. Lack of access to urban markets limits the possibilities for the rural population to sell their surplus to urban consumers and to benefit from urban amenities. Areas that have limited linkages to the urban sector can become “spatial poverty traps”.

22. In 2004, FAO and UNEP jointly initiated the Global Land Cover Network (GLCN), a global collaborative project to develop a fully harmonised approach to make reliable and comparable baseline land cover data accessible at local, national and international level, especially for the user community in developing countries. Regional collaborative networks have already been established for sub-regions in Africa and the Americas, Middle East, South-east Asia and Central Asia. Through an ongoing Memorandum of Understanding, FAO and UNEP support a number of GLCN outreach and capacity building activities, including a bimonthly e-newsletter, publications on GLCN and the Land Cover Classification System (LCCS), multi-lingual software for LCCS, documents to promote LCCS as an ISO standard, support to a regional training workshop in India held in 2006, and preparations for further training workshops in China, Morocco, Namibia, Oman and Uruguay in 2007. Land cover mapping for Libya was completed in 2006. After the success of these initiatives, GLCN is now launching the new West Africa project to carry out mapping and capacity building activities in thirteen countries. A project involving land cover mapping in Afghanistan will be initiated in 2007. GLCN staff are also currently involved in the update of the Mangrove Atlas of the World, an initiative in collaboration with the International Society for Microbial Ecology (ISME), the International Tropical Timber Organization (ITTO), UNESCO's Man and the Biosphere Programme (UNESCO-MAB), the UNEP World Conservation Monitoring Centre (UNEP-WCMC) and the United Nations University International Network on Water, Environment and Health (UNU-INWEH).

C. Using space to prevent drought and combat desertification

23. Space technology has made substantial contribution in all the three phases (preparedness, prevention and relief) of drought and flood disaster management. Satellite remote sensing data is recognized as an essential information source for identifying environmental indicators for producing risk maps of desertification, soil erosion and desalinisation. Drought forecasting also rely on satellite imaging systems. With respect to the large scale spatial scale data gathered from meteorological satellites, polar orbiting satellites have the advantage of providing much higher resolution imageries, even if at expense of temporal frequency.

24. The occurrence of drought as a consequence of climate change can be detected directly by satellite images and other remote sensor products, or indirectly by monitoring deforestation, soil erosion, reduced precipitation and other natural and man-made processes.

25. Early detection through the use of remote sensing technology allows decisions to be taken to prevent, correct and mitigate the effects of this phenomenon. These activities should be complemented by the use of other technologies, such as geographic information systems, which are compatible with remote sensing data.

26. In addition to optical remote sensing instruments, radar satellites are also used for drought forecasting and desertification mapping. With regard to desertification, SAR has potential in the monitoring and mapping of water resources, and is a primary instrument for sustainable water management and a weapon for desert fight. Other great advantages of the SAR are due to the possibility to evaluate the soil moisture contents (even in arid regions), to apply to the study of desertification some indirect techniques like the analysis of deforestation and the soil erosion, while the cloud penetrating capability allows the mapping desertification in semi-arid and sub-humid region. The data collected and research arising from these applications can assist policymakers and decision makers to monitor and manage atmospheric pollution and air quality in their countries.

27. United Nations entities, such as ESCAP, will continue developing regional cooperative mechanisms under global partnership on space information for disaster reduction, with initial focus on drought and flood disasters. On the development of a regional cooperative mechanism on drought disaster management, China, India, Thailand and FAO have expressed their commitments to partner with ESCAP. In close cooperation with Asia-Pacific Regional Space Agency Forum (APRSAF) and its members, the Sentinel-Asia project is under development with initial focus on flood and wildfires. The project aims to develop a regional disaster reduction support platform system in utilizing space information, to be supported by space faring countries in the region, and other regional and international initiatives, such as GEOSS and SPIDER.

28. Participants of the United Nations/ESA/Syria Regional Workshop on the Use of Space Technology for Disaster Management in Western Asia and Northern Africa, which was organized by the Office for Outer Space Affairs in Damascus, Syria, in April 2006, as part of the United Nations Programme on Space Applications, emphasized that further research and development in satellite data applications would provide reliable solutions for forecasting and combating impact of flooding, drought and desertification in the region. In this regard, two follow-up projects were initiated by the participants of the workshop. One project focuses on the development of an early warning strategy for disaster management using space technologies, and another concerns data access and sharing in relation to establishment of base maps for focused types of natural disasters, in the region. Both projects are carried out through a network of national teams established at the workshop, and with assistance of the Office for Outer Space Affairs. Implementation of these projects will eventually result in improving national and regional coordination mechanisms for matters relating to natural disaster management, as well as in strengthening capacities of countries in the region to respond to natural disaster challenges and in enhancing regional cooperation in this area.

D. Space solutions for sustainable development for Africa

29. There are several programmes and projects involving United Nations entities, where space technology and its applications are used, and that address the overall sustainable development for Africa. With regard to the areas under focus in thematic cluster 2008-2009, the following examples can be given.

30. The WMO Agricultural Meteorology Programme (AGMP) uses remotely sensed data from satellites coupled with ground weather station data in the field of agricultural meteorology. The objective of the programme is to improve the operational capability of the agrometeorological services around the world. AGMP will help promote the participation of agricultural meteorologists in National Meteorological and Hydrological Services (NMHSs) in the African Monitoring of the Environment for Sustainable Development (AMED) project, which aims to develop new applications using satellite technologies and other ancillary data in support of sustainable development in Africa.

31. Another example involving the United Nations family is the AFRICOVER project, whose goal is to establish a digital geo-referenced database on land cover and a geographic referential (a type of reference map which includes place names, roads and water distribution). The project is based on Landsat TM and ancillary data for the following 10 African countries: Burundi; Democratic Republic of Congo; Egypt; Eritrea; Kenya; Rwanda; Somalia; Sudan; United Republic of Tanzania; and Uganda.

32. The methodological results of AFRICOVER are the basis for a Global Land Cover Network (GLCN) initiative, initiated by FAO and UNEP (see para. 22 above). International standards are important because they ensure that the same data can be used by different organizations around the world. An extension of the work completed for the AFRICOVER project is the ASIACOVER project. The aim of the ASIACOVER project is to prepare a regional, standardized land cover database, integrated with socio-economic information to serve as a decision-making tool for food security and sustainable development in Southeast Asia.

33. UNEP/DEWA-Africa is coordinating the technical implementation of the African Environmental Information Network (AEIN) in response to a request of the African Ministerial Conference on the Environment (AMCEN). AEIN focuses on developing infrastructure mechanism for collating and storing geo-spatial and bibliographic data, along with professional expertise to analyse and generate policy-oriented information to be communicated to decision-makers.

34. ECA is collaborating with the African Union to prepare a transport infrastructure master plan for Africa. The main objective of this program of activities is to produce an integrated optimum all-mode Transport Infrastructure Master Plan for Africa. Producing this master plan will require access to data on all existing and planned networks and corridors of development, including railways, airports, roads, ports, harbours and waterways, and related social economic information. These transport components need to be depicted in their correct spatial locations and cross-referenced with one another to perform a full analysis of all relevant factors. Since there is currently no database containing these very necessary data sets, another major objective of the project is therefore to create a database (using Remote sensing and Global Positioning Systems techniques) in a geographic information system to support the proper planning, design, operations and maintenance of infrastructure facilities. ECA works with the United Nations World Food Programme (WFP) in sharing relevant data and satellite images.

35. The United Nations Programme on Space Applications has compiled a database with all the available donated African Landsat scenes and has initiated a project entitled "Distribution and Use of Available Global Landsat Data Sets for Sustainable Development in Africa". The project focused on facilitating the distribution of Landsat data sets within Africa for education, training and development projects on the national and regional levels. In 2006, Landsat data were provided to the following institutions for land use and rural development related applications: the National Cartographic Institute of Cameroon, for mapping land-use and land-cover change; the International Commission of the Congo-Ubangi-Sangha Basin of the Democratic Republic of Congo, for mapping of flood plain inundation zones during both dry and wet seasons; and the International Institute for Geo-Information Science and Earth Observation of the Netherlands, for mapping vegetation in Ghana.

36. The satellite-based technologies play a vital role in disseminating distress alert and location information in maritime and aviation distress situations, and providing critical assistance in terms of near real-time search and rescue operations. The Office for Outer Space Affairs, through the United Nations Programme on Space Applications, held a Training Course on Satellite-Aided Search and Rescue, with the cooperation and participation of 13 southern African countries in November 2006 in Cape Town, South Africa. The training course aimed at promoting awareness about the International Satellite System for Search and Rescue (COSPAS-SARSAT) and establishing a formal and reliable protocol with the countries in the region to better understand and coordinate system's activities and operations, thus enabling the system to play an important role in saving lives.

III. Capacity-building and training opportunities for developing countries in space science and technology and their applications

37. Capacity-building and training opportunities for developing countries in space science and technology and their applications directly relate to the implementation of the thematic clusters and the cross-cutting issues.

38. In relation to the specific issues addressed in the thematic cluster and cross-cutting issues 2008-2009, the Office for Outer Space Affairs, within the framework of the United Nations Programme on Space Applications, has organized in 2006 several workshops, training courses, expert meetings and projects. Some examples are given above (see paras. 28, 35 and 36 above). For their objectives and accomplishments see Report of the Expert on Space Applications (A/AC.105/874).

39. The priority thematic areas of the Programme continue to be the use of space technology for disaster management, satellite communications for tele-education and telemedicine applications, monitoring and protection of the environment, management of natural resources and education and capacity-building, including research areas in basic space sciences and space law.

40. In 2007, among the 10 activities that the Programme has scheduled in coordination with co-organizers, the following activities directly address the thematic cluster 2008-2009 and cross-cutting issues:

(a) United Nations/Morocco/European Space Agency International Workshop on the Use of Space Technology for Sustainable Development, Rabat, 25-27 April 2007;

(b) United Nations/Mexico Pan-American Health Organization/Training Course on Satellite Technology for Tele-health. Mexico City, 25-29 June 2007;

(c) United Nations/ International Astronautical Federation Workshop on the Use of Space Technology for Sustainable Development Towards Food Security. Hyderabad, India 21-22 September 2007;

(d) United Nations/Russian Federation/European Space Agency Workshop on the Use of Microsatellite Technologies for Monitoring the Environment and Its Impact on Human Health. Moscow, 3-7 September 2007;

(e) United Nations/Viet Nam/ European Space Agency Workshop on Forest Management and Environmental Protection. Hanoi, 5-9 November 2007; and

(f) United Nations/Argentina/European Space Agency Workshop on Sustainable Development in Mountain Areas of Andean Countries. Mendoza, Argentina 26-30 November 2007.

41. A directory of the activities of the Programme on education, training, research and fellowship opportunities in space science and technology is available on: www.unoosa.org/oosa/SAP/eddir/index.html.

IV. Conclusion

42. Space science and technology and their applications, coupled with advances made in other fields of science and technology, can enable States to overcome obstacles to development and offer distinctive tools for ensuring sustainability.

43. By establishing a closer link between the Committee on the Peaceful Uses of Outer Space and the Commission on Sustainable Development, the synergies between the implementation of the recommendations of UNISPACE III and the overarching development agenda set by the World Summit on Sustainable Development would be strengthened.

44. In accordance with the request of the General Assembly, the Committee will continue to examine the contribution that could be made by space science and technology and their applications to the issues selected by the Commission on Sustainable Development as a thematic cluster and will provide inputs for consideration by the Commission.

45. To strengthen its contribution to the work of the Commission and encourage interaction between the two bodies, the Committee invites the Director of the Division for Sustainable Development of the Department of Economic and Social Affairs of the Secretariat to participate in the sessions of the Committee to inform it on how it could best contribute to the multi-year programme of work of the Commission. The next session of the Committee will be held in Vienna from [...] to [...] June 2008.