

6 February 2009

Original: English

---

**Committee on the Peaceful  
Uses of Outer Space**  
**Scientific and Technical Subcommittee**  
**Forty-sixth session**  
Vienna, 9-20 February 2009  
Agenda item 5  
**Implementation of the  
recommendations of UNISPACE III**

**Contribution of the Committee on the Peaceful Uses of  
Outer Space to the work of the Commission on Sustainable  
Development for the thematic cluster 2010-2011**

**Note by the Secretariat**

The Committee, at its fifty-first session in 2008, agreed upon the plan for its contribution to the work of the Commission on Sustainable Development for the thematic cluster 2010-2011 (A/AC.105/2008/CRP.3). The Committee further agreed that, in accordance with that plan, the Secretariat would send out requests to all member States and permanent observers of the Committee and, through the Inter-Agency Meeting on Outer Space Activities, to United Nations entities for inputs to the contribution of the Committee to the issues to be addressed by the Commission in the period 2010-2011 (A/63/20, para. 58). The Secretariat, in a Note Verbale of 5 September 2008, invited member States to submit contributions in accordance with the plan agreed by the Committee. The Secretariat has not received any contributions, and therefore presents a draft outline below for consideration by the Working Group of the Whole of the Scientific and Technical Subcommittee. The draft outline is aimed at assisting in the finalization of the report of the Committee.

**Multi-year programme of work of the Commission on Sustainable Development**

The multi-year programme of work of the Commission on Sustainable Development includes several areas where space science and technology and their applications play an important role.



The multi-year programme of the Commission is divided in the following thematic clusters:

- 2004-2005: Water; sanitation; and human settlements;
- 2006-2007: Energy for sustainable development; industrial development; and air pollution/climate change;
- 2008-2009: Agriculture, rural development; land; drought; desertification; and Africa;
- 2010-2011: Transport; chemicals; waste management; mining; and a ten year framework of programmes on sustainable consumption and production patterns;
- 2012-2013: Forests, biodiversity, biotechnology; tourism; and mountains;
- 2014-2015: Oceans and seas; marine resources; small island developing states; and disaster management and vulnerability;
- 2016-2017: Overall appraisal of the implementation of Agenda 21, and the programme of further implementation of Agenda 21 and the Johannesburg Plan of Implementation.

Common to each biennial cycle from 2004 to 2017 the following cross-cutting issues are addressed:

- Poverty eradication;
- Changing unsustainable patterns of consumption and production;
- Protecting and managing the natural resource base of economic and social development;
- Sustainable development in a globalizing world;
- Health and sustainable development;
- Sustainable development and SIDS;
- Sustainable development for Africa;
- Other regional initiatives;
- Means of implementation;
- Institutional framework for sustainable development;
- Gender equality; and
- Education.

Each two-year cycle of the Commission comprises a review year and a policy year. It is advisable that the contribution by the Committee be made at each review year of the cycle, in order to make possible the inclusion of appropriate space-related elements in the Secretary-General report, and thus provide for such contributions to be taken into account by the Commission during the policy year.

In accordance with the implementation plan of the UNISPACE III+5 review, as contained in document A/59/174, the Committee on the Peaceful Uses of

Outer Space provided contributions to the thematic cluster 2006-2007 (A/AC.105/872), and to the thematic cluster 2008-2009 (A/AC.105/892).

At the forty-seventh session of the Legal Subcommittee in 2008, the Secretariat informed the Subcommittee that, following coordination between the Office for Outer Space Affairs and the Division for Sustainable Development, the Committee's contribution to the work of the CSD for the thematic cluster 2008-2009 would be distributed as a background paper (DESA/DSD/2008/2) at the 16th session of the Commission (CSD-16). The Secretariat also informed the Subcommittee that the importance of the role of space technology applications in sustainable development was included in paragraphs 48 and 49 of the report of the Secretary-General on "Review of Implementation of Agenda 21 and the Johannesburg Plan of Implementation: drought" (E/CN.17/2008/6).

Pursuant to General Assembly resolution 62/217, the Director of the Office for Outer Space Affairs attended the 16th session of the Commission on Sustainable Development, and made a presentation in the thematic discussions on "Inter-linkages and all cross-cutting issues" on Friday 9 May 2008. The presentation highlighted the contribution of the Committee to the work of CSD for the thematic cluster 2008-2009, with the objective to raise awareness on the role of space-based technologies and their applications to the thematic cluster areas under consideration: agriculture; land use and rural development; drought and desertification; and sustainable development in Africa. In her speech, the Director pointed to examples that capture the role of space technology applications in contributing to food security. In that regard, she stressed the benefit of international cooperation in developing, deploying and disseminating space technology applications, which help achieve multiple impacts and objectives in the CSD thematic cluster, including agriculture and land use. The Director pointed to a number of global and regional mechanisms and initiatives to support Member States in taking advantage of space solutions, and stressed the need to bring the different stakeholders together and to avoid duplication of efforts.

In its report on the sixteenth session of the Commission on Sustainable Development, 11 May 2007 and 5-16 May 2008, the Commission observed that "access to space technologies and their applications, including systems of earth observation, meteorological satellites and communications, as well as satellite navigation systems for the monitoring and evaluation of the environment, allowed for better monitoring and mapping of desertification processes and drought events. Capacity-building in the utilization of space technologies and their application improved the knowledge base as regards drought management, climate change adaptation and crop forecasting, including the prediction of harvest schedules" (Official Records of the Economic and Social Council, 2008, Supplement No. 9, E/2008/29, E/CN.17/2008/17, Chapter D. Means of implementation, paragraph 132).

#### **Contribution by the Committee to the work of CSD for the thematic cluster 2010-2011**

The Scientific and Technical Subcommittee, at its forty-fifth session in 2008, endorsed the recommendation of the Working Group of the Whole that the Secretariat should prepare, for consideration by the Committee on the Peaceful Uses of Outer Space at its fifty-first session, a template and guidelines for use by

member States and permanent observers of the Committee in preparing inputs to the contribution of the Committee to the issues to be addressed by the Commission on Sustainable Development (CSD) in the period 2010-2011 (A/AC.105/911, paras. 61 and 70, and Annex I, paras. 11-13).

The Committee, at its fifty-first session in 2008, agreed that the contribution of the Committee should examine the areas of the thematic cluster in which space technology and its applications played a particularly important role; pay attention to the cross-cutting issues identified by the Commission; identify areas where space-based systems could complement terrestrial systems in order to promote integrated solutions; and include, as appropriate, national success stories that might provide useful examples for the overall contribution of the Committee (A/63/20, para. 59).

The Secretariat has prepared the following draft outline to be used for preparing the contribution by the Committee for the period 2010-2011. The purpose of the outline is to help with the collection of concrete information that clearly demonstrate how space science and technology and their applications can address the thematic cluster under consideration. Examples of regional and international success stories can be used to illustrate the usefulness of space-based solutions for sustainable development. At the same time it would also be important to address lessons learned as well as challenges and constraints to the effective implementation, including examples of efforts to avoid duplication of efforts.

The Inter-Agency Meeting on Outer Space Activities, at its 28th session in January 2008, agreed that it should continue to provide relevant information that could be included in the report of the Committee on its contribution to the Commission for the thematic cluster 2010-2011. The 28th Inter-Agency Meeting also agreed that the Office for Outer Space Affairs would prepare, in cooperation with the Economic Commission for Africa and in consultation with other United Nations entities, a report on sustainable development for Africa, to be presented to the Third African Leadership Conference on Space Science and Technology for Sustainable Development, to be held in Algeria in 2009. The Office is using that report to create synergies in the contribution of United Nations entities to the present report addressing thematic cluster 2010-2011.

**Draft outline of the contribution of the Committee on the Peaceful Uses on Outer Space to the Commission on Sustainable Development for the thematic cluster 2010-2011**

**I. Introduction**

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 the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (A/59/174), in which the Committee reviewed the mechanisms for and progress made in implementing the recommendations of UNISPACE III, 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. 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.

Paramount to the strategy for implementing the recommendations of UNISPACE III 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 and the World Summit on Sustainable Development.

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, and its contribution to the thematic cluster 2008-2009 was described in document A/AC.105/892 of 13 July 2007. These documents informed 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.

In its resolution 63/90 of 5 December 2008, the General Assembly noted with satisfaction that the Committee had 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 addressed by the Commission.

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 continue to be invited to participate in the sessions of the Committee to inform it how it could best contribute to the work of the Commission on Sustainable Development and that the Director of the Office for Outer Space Affairs of the Secretariat should continue to 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 for sustainable development**

In its contribution to the thematic cluster 2006-2007 and 2008-2009 the Committee on the Peaceful Uses of Outer Space highlighted the role of space in sustainable development, which can be summarized as follows:

### *Thematic cluster 2006-2007*

Space applications, such as remote sensing, are fast becoming vital tools in measuring the level of air pollution and monitoring and observing the atmosphere and its interaction with the Earth. Among the primary areas of space research and applications is the determination of the quality of air and any changes in it and changes in the ozone layer. The detection, transportation, spread and tracking of pollutants over large spatial domains and even localized regions can be effectively monitored by using space applications such as remote sensing. Furthermore, the interaction of air pollutants in the atmosphere can also be monitored and studied.

These applications are also the only source of data for remote and rural regions where ground-based measurements are not available or possible.

Many satellites now carry sensors that are specifically designed to monitor atmospheric pollutants. Satellites designated to study the Earth's ozone and air quality contain sensors that specifically measure trace gases in the troposphere. Many other satellites are dedicated to environmental monitoring and the study of climate change. These satellites and the instruments they carry are examining the changes in the global climate caused by increasing concentrations of greenhouse gases and contribute to providing an accurate global picture of sea surface temperatures, greenhouse gases in the atmosphere and the ozone levels in the atmosphere. Satellite data also contribute to the study and forecasting of the El Niño event by monitoring unusual ocean currents and changes in sea surface temperature. Over the next 25 years, the anticipated developments in space-based observing systems, data processing and information and communications technology will further improve space applications for environmental and climate change monitoring and research.

Space-based technologies play an important role in the identification of sources of new and renewable energy and facilitate the assessment of the threats associated with the sustained use of non-renewable, and especially carbon-based, fuels. Images from remote sensing satellites are being used to aid the search for oil reserves and to monitor oil spills. Satellite navigation systems are used to manage energy networks. Space technology is also being used to improve the generation, transmission and use of energy on Earth. For example, the monitoring of space weather and solar storms can help in the management of electricity networks and can, as a result of the spin-offs of space exploration, lead to the improvement of solar cell efficiency. Space spin-off technologies can also help to strengthen industrial processes and development, for example with regard to instrumentation, design practices, operational use and safety procedures for the storage of hydrogen as a fuel, thus opening an arena for fuel cell research and development.

#### *Thematic cluster 2008-2009*

Land use and infrastructure are important factors for development in rural areas. Accurate land-use data at the right spatial resolution is a primary source of information for decision makers. The fact that remote-sensing products have wide coverage means that investigators and others can use that information to produce land-use and land-cover maps as the first step in various applications. Among other things, those data are used to establish rural land registers that also help to identify the capabilities and limitations of those land areas.

Low-resolution satellite data, for example, moderate resolution imaging spectrometer data, advanced very high resolution radiometer data and ancillary data (such as data on precipitation and temperature, climatic maps, land-use maps, topographic and soil maps, life zone maps, vegetation maps and the historical record of droughts) are useful to predict land surface changes and to 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 concerning, among other things, soil, geology, slope, geomorphology, land use, hydrology and faults. The

selection of the most adequate high-resolution satellite data (e.g. from the Landsat thematic mapper or SPOT) is essential in extracting land surface information.

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

Available high-resolution satellite remote sensing data combined with GNSS data contribute to the development of precision farming techniques for monitoring crops on individual farms. Those techniques help to precisely identify areas under stress due to lack of water, in need of fertilizer or affected by disease. Accurate targeting of such areas contributes to an optimal distribution of water and fertilizers, which not only improves crop yields but also saves money and reduces the environmental impact of agricultural activities.

Radar imagery is particularly useful in regions where cloud cover may obscure the land surface. Synthetic aperture radar (SAR) data, for example, are used to measure the increase in the length of the growing season in boreal regions as an indicator of global warming; to monitor the extent and frequency of wildfires in boreal regions in order to better understand the role of the burning of biomass 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.

The occurrence of drought as a consequence of climate change can be detected directly by using satellite images and other remote-sensing products and indirectly by monitoring deforestation, soil erosion, reduced precipitation and other natural and man-made processes. The early detection of drought through the use of remote sensing technology enables decisions to be taken to prevent and mitigate its effects. Those activities should be complemented by the use of other technologies that are compatible with remote sensing data, such as geographic information systems. In addition to optical remote sensing instruments, radar satellites are also used to forecast droughts and map desertification. SAR has potential for monitoring and mapping water resources and is a primary instrument for managing sustainable water resources and combating desertification. The data collected and the research resulting from those applications can assist policymakers and decision makers in monitoring and managing atmospheric pollution and air quality in their respective countries.

### **III. Space contributions to the thematic cluster 2010-2011**

Space applications are effective tools for monitoring and conducting assessments of the environment, managing the use of natural resources, providing early warnings of and managing natural disasters, providing education and health services in rural and remote areas and connecting people around the world. They are multifaceted and often offer, through a single instrument or application, the means for States to make development decisions concerning various cross-cutting issues. Space technology

and its applications, such as Earth observation systems, meteorological satellites, satellite communications and satellite navigation and positioning systems, therefore strongly support the implementation of actions called for at 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 the period 2010-2011. Regional and interregional cooperation and coordination provide essential mechanisms for advancing such international efforts.

### **Proposed themes**

#### **A. The role of space in transport**

#### **B. The use of space technology in sustainable resource management**

#### **C. Space solutions for sustainable consumption and production**

The thematic cluster for 2010-2011 contains:

- Transport
- Chemicals
- Waste management
- Mining
- Ten year framework of programmes on sustainable consumption and production patterns

Sample of useful CSD documents:

- Secretary-General report on transport (*E/CN.17/2001/3 of 13 December 2000*);
- Secretary-General report on energy and transport (*E/CN.17/2001/PC/20 of 2 March 2001*);
- Secretary-General report on management of toxic chemicals and hazardous and radioactive wastes (*E/CN.17/2001/PC/19 of 14 March 2001*);
- Secretary-General report on comprehensive review of changing consumption and production patterns (*E/CN.17/1999/2 of 13 January 1999*);
- Background document to the draft 10YFP on SCP in preparation for CSD 18-19 (explaining the “Marrakesh Process” as follows: The Marrakech Process was launched in 2003 to build political support for the implementation of SCP and to prepare input for negotiations at CSD 18-19. The Marrakech Process is a global process to support the elaboration of a 10-Year Framework of Programmes (10YFP) on sustainable consumption and production, as called for by the WSSD Johannesburg Plan of Action. Its goal is to assist countries in their efforts towards sustainability, to green their economies, to help corporations develop sustainable business models, and to encourage consumers to adopt more sustainable lifestyles).

These background documents demonstrate cross-cutting inter-linkages with the thematic clusters already addressed by the Committee in the period 2006-2007/2008-2009, in areas such as:



- Energy
- Industrial development
- Air pollution/climate change
- Land use and rural development
- Agriculture

The 10-year framework of programmes on sustainable consumption and production patterns (10 YFP on SCP), for instance, assesses global and regional priorities in areas such as:

- Water resource management and sanitation
- Energy
- Industrial development
- Habitat and urban development
- Rural development
- Transport
- Waste management

The idea of negotiating a 10YFP on SCP arises from the WSSD in Johannesburg. The 10YFP is a topic in the clusters of issues that will be discussed during the CSD 18-19 cycle in 2010 and 2011. A broad process of consultation has been engaged in order to raise awareness on the issues at stake and identify relevant topics and contents for the 10YFP. The Marrakech Process has been used as the vehicle for this preparation work.

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

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.

In its report 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 and 2008-2009, 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 activities of the regional centres for space science and technology education, affiliated to the United Nations, which are located in Brazil and Mexico (for Latin America and the Caribbean), India (for Asia and the Pacific), Morocco (for French-speaking Africa), and Nigeria (for English-speaking Africa).

In relation to the specific issues addressed in the thematic cluster and cross-cutting issues of the Commission on Sustainable Development for the period 2010-2011, the Office for Outer Space Affairs, within the framework of the United Nations Programme on Space Applications, organized in 2008 several workshops, training

courses, expert meetings and projects. The objectives and accomplishments of those initiatives are described in the report of the Expert on Space Applications (A/AC.105/925).

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.

In 2009, among the activities that the Programme has scheduled in coordination with co-organizers, the following activities directly address the thematic cluster 2010-2011 and cross-cutting issues:

*[include list of Workshops and other activities]*

A directory of the activities of the United Nations Programme on Space Applications in the areas of education, training, research and fellowship opportunities in space science and technology is available on the website of the Programme ([www.unoosa.org/oosa/SAP/eddir/index.html](http://www.unoosa.org/oosa/SAP/eddir/index.html)).

## **V. Conclusion**

Space science and technology and their applications, coupled with advances made in other fields of science and technology, offer a wide range of specific tools and solutions and can enable and support States in overcoming obstacles to sustainable development.

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

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.

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 2010.