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English only

**Committee on the Peaceful
Uses of Outer Space**
Scientific and Technical Subcommittee
Fiftieth session
Vienna, 11-22 February 2013
Long-term sustainability of outer space activities

**Preliminary draft report and proposed candidate guidelines
of expert group A: Sustainable Space Utilization Supporting
Sustainable Development on Earth**

I. Introduction

1. Expert group A has developed its activities in accordance with the workplan contained in A/AC.105/C.1/L.324, and held two meetings on 7 and 11 June 2012, on the margins of the fifty-fifth session of the Committee on the Peaceful Uses of Outer Space, under the chairmanship of Filipe Duarte Santos (Portugal).
2. At the first meeting the expert group agreed on the appropriate status, reliability and relevance of the information provided to support its deliberations.
3. The expert group followed the areas of work identified in its workplan and gave detailed consideration to the following topics:
 - (a) **Contribution of space science and technology to sustainable development on Earth, early warning of potential disasters and support for management of disaster-related activities**
 - (i) Applications of Earth observation for sustainable development in the following areas:
 - a. Human security and welfare, human health and its relation to environmental change;
 - b. Sustainable agricultural management and development, including crop system analysis, assessment and management of drought and assessment of land productivity and land degradation;
 - c. Development and management of water resources;

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- d. Development and management of forests, including forest fires;
 - e. Management of ecosystems and biodiversity conservation;
 - f. Management of energy resources;
 - g. Mineral and mining exploration and management;
 - h. Land-use and urban planning;
 - i. Other areas related to the Millennium Development Goals and to the outcomes of the Rio+20 Conference;
- (ii) Applications of Earth system observation for monitoring the Earth system:
- a. Atmosphere and ocean observation;
 - b. Weather forecasting;
 - c. Monitoring of climate change and its impacts, including climate system tipping points, in order to support mitigation and adaptation to climate change, including by monitoring carbon stocks and greenhouse gas emissions;
- (iii) Applications of communications satellites:
- a. Radio and television;
 - b. Telephone transmissions;
 - c. Tele-health;
 - d. Tele-education;
- (iv) Applications of GNSS in everyday life such as:
- a. Navigation, cell phone operations, social networking and emergency assistance;
 - b. Land, air and maritime navigation, traffic control and rescue operations;
 - c. Finance industry;
 - d. Surveying, mapping and geographic information systems;
 - e. Precise time reference;
 - f. Geophysics and geology, including monitoring earthquake prone areas and volcanic activity;
 - g. Agriculture, including guidance, tracking and soil sampling;
- (v) Applications of space systems for disaster warning, prevention and management such as:
- a. Early warning and management of disasters related to geophysical, meteorological, hydrological and climate events;
 - b. Vulnerability and risk analyses for disaster prevention;
 - c. Rapid mapping, communication and assessment of local emergency situations;

- d. Post-disaster reconstruction activities.
- (b) **Equitable access to outer space and to the resources associated with it, as well as to the benefits of outer space activities for human development**
- (i) Access to orbital slots in the geostationary orbit;
 - (ii) Access to the radio frequencies in which the satellites operate.
- (c) **International cooperation in peaceful uses of outer space as a means of enhancing the long-term sustainability of outer space activities and supporting sustainable development on Earth**

International cooperation for:

- (i) Technical capacity-building;
 - (ii) Data accessibility and processing;
 - (iii) Institutional (public and private) and public awareness of space applications for sustainable development.
- (d) **The concept of sustainable development extended to the domain of outer space, including the avoidance of harmful contamination of celestial bodies**
- (i) Biological, chemical and radioactive contamination of celestial bodies;
 - (ii) Environmental impact assessment of celestial bodies, considering the biological, geophysical, industrial and cultural realms.

4. During the fifty-fifth session of the Committee, the chair of the expert group presented a draft proposal of candidate guidelines to enhance the contribution of space science and technology to sustainable development on Earth, which was discussed during the meetings. It was recalled that in accordance with the terms of reference and methods of work of the Working Group (A/66/20, Annex II, para. 13), the guidelines should promote the protection of the space environment, giving consideration to accepted and reasonable financial and other connotations and taking into account the needs and interests of developing countries. It was also recalled that the guidelines should be consistent with the existing legal frameworks for outer space activities and be voluntary and not legally binding.

5. During the fifty-fifth session of the Committee, meetings of the chair of the expert group A with co-chairs of the other expert groups and with the chair of the Working Group were used to address areas of mutual relevance and gaps, to identify cross-cutting issues and to avoid duplication of work.

6. It was agreed at the expert group meeting of 11 June that an intersessional informal meeting would be held during the 63rd International Astronautical Congress in Naples on 5 October 2012. In this informal meeting, co-chaired by Enrique Pacheco Cabrera (Mexico) and Filipe Duarte Santos (Portugal), a draft of proposed candidate guidelines was discussed and agreed to be presented as a conference room paper at the fiftieth session of the Scientific and Technical Subcommittee in February 2013.

7. In 2013, expert group A intends to further develop its draft report and recommendations for guidelines in accordance with its workplan.

II. Proposed candidate guidelines

8. Space activities play a vital role in supporting sustainable development on Earth. More specifically, space activities are essential for the achievement of the Millennium Development Goals, which provide a framework for the entire United Nations system and are some of the most broadly supported, comprehensive and specific development goals the world has ever agreed upon.

9. In the whole spectrum of areas related to sustainable development, ranging from addressing climate change, environmental protection and management of natural resources, to public health and human security, disaster management and humanitarian assistance, or promoting sustainable agriculture and strengthening food security, information generated from space-derived geospatial data is essential for making informed decisions for sustainable development at the local, national, regional and global levels. Access to space applications and space-derived geospatial data are indispensable tools to support human and environmental security as well as sustainable economic and social development, and should be promoted through regional and international cooperation. Raising awareness about the potential benefits of space technology and its applications, as well as establishing or strengthening the capacity to use space technology, should be at the centre of focus when furthering the fair, responsible and sustainable uses of outer space.

10. The following candidate guidelines are proposed by expert group A:

1. Promote, in collaboration with ITU, the equitable access to the geostationary orbit (GSO) to satisfy the requirements of developing countries for the use of the GSO and the radio frequency spectrum

11. The rational, equitable, efficient and economical use of the radio-frequency spectrum and orbital resources is one of the greatest challenges for long-term sustainability of outer space activities. It is becoming increasingly difficult to obtain suitable new orbital positions and to coordinate them in accordance with the radio frequency regulations. Consequently it is becoming increasingly difficult to exclude interfering signals from neighbouring systems. It is particularly important to control the use of the rights of satellite networks to prevent inactive networks at various orbital locations. In addition, it would be worth encouraging the use of frequency bands which are not congested (e.g. kA- band).

12. In this regard, the following guidelines are proposed:

(a) The establishment of a future registration system for space assets under the supervisory authority of the ITU, which addresses the current concerns, is recommended;

(b) The establishment of ITU Radio Regulations to prevent the congestion of spectrum and orbit resources that result from the existence of rights that are not being used is also recommended;

(c) In agreement with the ITU Constitution it is recommended that a greater effort should be made to ensure that countries and groups of countries may have equitable access to geostationary orbits and frequencies, taking into account the special needs of the developing countries and the geographical situation of particular countries;

(d) It is recommended that a greater effort should be made by ITU to ensure the efficient and equitable use of spectrum and orbital resources;

(e) Protect the specific bands used to monitor Earth observation, including, inter alia, ice, water, clouds, salinity and underground water resources.

2. Promote the institutional and public awareness of space activities and applications for sustainable development on Earth, early warning of potential disasters and support for management of disaster-related activities

13. Significant institutional and public awareness initiatives have been undertaken and are currently being carried by member States. These address organizations within the national Government such as departments and agencies; academic institutions at the elementary, secondary, college, pre and post-graduate levels; the industry, research centres and laboratories involved in space and non-space activities; and as well, the general public, especially youths.

14. Such activities may take the form of publications (traditional or electronic); events (media opportunities, seminars, workshops, demonstrations, exhibits); courses and tutorials; videos; to name a few. These activities are attuned to the national interest and context taking into consideration cultural specificities. Important activities are also conducted worldwide under the initiative of UNOOSA (international cooperation and SPIDER).

15. One issue appears to be the consistency and persistency of messages. This is of particular importance as regards the long-term sustainability of outer space activities in support of sustainable development on Earth. In planning and carrying out awareness activities, member States and organizations would benefit from a “handbook” of notional benefits and methods for promoting awareness that can then be further adapted to a national context. Such handbook could be assembled from the relation of national experiences successfully carried by member States (best practices) provided voluntarily after a format that would allow easy cataloguing and reference with the objective of promoting as best as possible consistency at the national and international levels.

16. For example, some national space agencies have carried a space awareness and education programme aimed at youths at the elementary level; the programme provided curriculum matters to teachers throughout the country so they could talk about space in an informed manner; use space as an example while teaching other matters; organize events to interest youths in science. The programme also allowed for an annual conference of teachers so they could benefit of each other’s experience. The format, terms of reference, outreach methods, success stories, resources and evaluation of such programme could be of benefit to other member States willing to promote space at the elementary level.

17. Other means identified to promote space could take various forms. It is generally felt that the outreach efforts are directed toward the “converted” and should instead aim at “space illiterate” individuals and organizations. An example is the health domain for which space could be of an invaluable contribution both in telemedicine and tele-epidemiology. But this is mostly discussed in the framework of space events instead of health events.

18. Another means that could possibly be adopted for the general public would be the branding of space through the repeated use of a logo in the form of “brought to you by space” on letterheads, pamphlets, videos and virtually all communications material. In that context, the casting of an international space day, or international space week would significantly help in the synergistic coordination of public awareness efforts.

19. In this regard, the following guidelines are proposed:

(a) To initiate the collection of information on public awareness and education tools and programmes aimed at disseminating the benefits of space to sustainable development at the national level to be provided voluntarily by member States, and to request the assistance of communications experts from member States and UNOOSA to help in the preparation of a living repertory of such information with the view of facilitating the development and implementation of similar initiatives with consistent messages as much as possible;

(b) Encourage the public institutions, private sector entities and civil society to employ various ways and means to raise public awareness of space applications for sustainable development, in particular taking into account the needs of the youth and the future generations.

3. Support and promote international cooperation for capacity-building, data accessibility and processing, taking into account the needs and interests of developing countries

20. Cooperation among various international entities such as the UN-SPIDER, UNOSAT, GEO, CEOS, the International Charter for Disaster Management and others is essential for proper and fair dissemination of data among the international community. It is encouraged that the various international initiatives complement each other instead of compete to better serve the global community and to avoid duplication of efforts.

21. In this regard, the following guideline is proposed:

(a) Support and promote international cooperation and information for capacity-building, data accessibility and processing, inter alia, in the field of disaster mitigation, space situational awareness relating to space debris, taking into account of the needs and interests of the developing countries.

4. Promote international cooperation to support the growing interest of many countries to establish national capacities for outer space activities through capacity-building and transfer of technology without affecting intellectual property rights, taking into account the requirement of long-term sustainability of those activities

22. It is very important that spacefaring nations and non-spacefaring nations use space in a collaborative way in order to achieve their common goals. The United Nations Programme on Space Applications has been addressing this question and has recently launched two new initiatives; the Basic Space Technology Initiative (BSTI) and the Human Space Technology Initiative (HSTI). It is necessary to support these initiatives and identify new forms or collaborative ways to promote space science and technology to build capacity in developing countries, particularly

through technology transfer without affecting intellectual property rights. Special attention should be given to regional cooperative mechanisms which can enhance cooperation and collaboration between spacefaring and emerging space countries and to establish partnerships between users and providers of space-based services.

23. In this regard, the following guidelines are proposed:

(a) Promote international technical cooperation to enhance the long-term sustainability of outer space activities and support the sustainable development on Earth;

(b) To support current initiatives and new forms of regional and international collaboration to promote capacity-building and the transfer of space technologies to emerging space countries, without affecting intellectual property rights, taking into account the needs and interests of developing countries and in accordance with international law.

5. Promote international cooperation to assist countries to assemble human resources, achieve technical and legal capabilities and standards compatible with the relevant regulatory frameworks, especially for countries that are beginning to develop their capacities in outer space applications and activities

24. International cooperation in assembling human resources, technical capabilities and financial resources is essential to ensure that non-spacefaring countries and emerging space countries can benefit from the use of outer space activities and applications. This cooperation should also ensure that the new spacefaring countries use the standards and regulations of long-term sustainability for their activities.

25. In this regard, the following guidelines are proposed:

(a) Support current initiatives and promote regional and international cooperation to assist countries to assemble human and financial resources, achieve efficient technical capabilities and standards for outer space activities, compatible with long-term sustainability and relevant regulatory frameworks;

(b) Support current initiatives and promote new forms of regional and international cooperation to assist emerging space countries to implement national space regulations taking into account the need for the long-term sustainability of space activities.

6. Promote the development of studies and other initiatives on the regulatory regime for the sustainable use of outer space including the other celestial bodies

26. One aspect of this point concerns planetary protection that is, the protection of planets, other celestial bodies and the Earth from biological contamination. Much knowledge and practice have been accumulated by some spacefaring nations in the context of probes, namely, sent to the Moon, Mars, comets, asteroids and other planets about the desirable aseptisation requirements, which have appeared in numerous and complex documents including through the Committee on Space Research (COSPAR). With the increasing number of spacefaring nations capable of sending probes, perhaps the time has come for the United Nations to consider the adoption of guidelines aimed at the implementation of principles found in various documents aimed at preserving the sustainable use of outer space.

27. In this regard, the following recommendation could be proposed:

(a) To consider developing a set of guidelines, taking into account the practices and standards implemented by various nations including the procedures and recommendations of COSPAR, to prevent the biological contamination of the Earth and the other celestial bodies in the context of sustainable development and use of outer space.
