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**Committee on the Peaceful
Uses of Outer Space****Report on the United Nations/Viet Nam/European Space
Agency Regional Workshop on the Use of Space Technology
for Forest Management and Environmental Protection****(Hanoi, 5-9 November 2007)****Contents**

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I. Introduction

A. Background and objectives

1. At the World Summit on Sustainable Development, held in Johannesburg, South Africa, from 26 August to 4 September 2002,¹ Heads of State and Government reaffirmed their strong commitment to the full implementation of Agenda 21,² which had been adopted at the United Nations Conference on Environment and Development, held in Rio de Janeiro, Brazil, from 3 to 14 June 1992. They also committed themselves to achieving the internationally agreed development goals, including those contained in the United Nations Millennium Declaration (General Assembly resolution 55/2 of 8 September 2000). The Summit adopted the Johannesburg Declaration on Sustainable Development³ and the Plan of Implementation of the World Summit on Sustainable Development (Johannesburg Plan of Implementation).⁴

2. In its resolution 54/68 of 6 December 1999, the General Assembly endorsed the resolution entitled “The Space Millennium: Vienna Declaration on Space and Human Development”,⁵ which had been adopted by the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), held in Vienna from 19 to 30 July 1999. UNISPACE III had formulated the Vienna Declaration as a nucleus of a strategy to address future global challenges using space applications. In particular, the Vienna Declaration noted the benefits and applications of space technologies in addressing the challenges to sustainable development, as well as the effectiveness of space instruments for dealing with the challenges posed by the depletion of natural resources, the loss of biodiversity and the effects of natural and anthropogenic disasters.

3. Implementation of the recommendations contained in the Vienna Declaration supports the actions called for in the Johannesburg Plan of Implementation to strengthen the capacities of Member States, in particular of developing countries, in order to improve the management of natural resources by increasing and facilitating the use of remote sensing data, and increasing access to more affordable satellite imagery.

4. At its forty-ninth session, in 2006, the Committee on the Peaceful Uses of Outer Space endorsed the programme of workshops, training courses, symposiums and conferences of the Programme on Space Applications for 2007. Subsequently, the General Assembly, in its resolution 61/111 of 14 December 2006, endorsed the

¹ *Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August-4 September 2002* (United Nations publication, Sales No. E.03.II.A.1 and corrigendum).

² *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992* (United Nations publication, Sales No. E.93.I.8 and corrigenda), vol. I: *Resolutions adopted by the Conference*, resolution 1, annex II.

³ *Report of the World Summit on Sustainable Development*, chap. I, resolution 1, annex.

⁴ *Ibid.*, chap. I, resolution 2, annex.

⁵ *Report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 19-30 July 1999* (United Nations publication, Sales No. E.00.I.3), chap. I, resolution 1.

activities to be carried out under the auspices of the United Nations Programme on Space Applications in 2007.

5. Pursuant to General Assembly resolution 61/111 and in accordance with the recommendations of UNISPACE III, the United Nations/Viet Nam/European Space Agency Regional Workshop on the Use of Space Technology for Forest Management and Environmental Protection was held in Hanoi, from 5 to 9 November 2007.

6. The Workshop was organized by the Office for Outer Space Affairs of the Secretariat, as part of the activities of the United Nations Programme on Space Applications for 2007, in cooperation with the European Space Agency and the Government of Viet Nam. On behalf of the Government of Viet Nam, the event was co-organized by the Ministry of Science and Technology, the Vietnamese Academy of Science and Technology, the Ministry of Foreign Affairs, the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Rural Development of Viet Nam. The Workshop was hosted by the Ministry of Science and Technology and the Vietnamese Academy of Science and Technology on behalf of the Government of Viet Nam.

7. The Workshop built upon a series of meetings on the integrated application of space technologies in the areas of natural resources management, environmental protection and natural disaster mitigation that was organized by the United Nations Programme on Space Applications in the period 2005-2007.

8. The Workshop promoted the integrated use of the demonstrated capabilities of space technology to support national, regional and international efforts in forest management and environmental protection that could reduce the vulnerability of natural resources. The meeting focused on using space technologies to improve forest and environmental management and to reduce the impact of natural disasters such as deforestation, forest fires and land degradation.

9. The primary objectives of the Workshop included the following: (a) to encourage the use of space technologies through the integration of applications related to environmental protection and forest management; (b) to increase awareness among decision makers and managers of the benefits of using space technologies for environmental development; (c) to enhance interaction between decision makers and those involved in space research and development; (d) to discuss the strategy for including space technology applications and information in the decision-making process in monitoring forest resources and environmental protection in order to improve disaster management as related to forest problems; (e) to examine the low-cost space-related technologies and informational resources available for addressing forest management, environmental sustainability and disaster management; (f) to strengthen regional and international cooperation in those fields; and (g) to stimulate proposals for national, regional and international pilot projects using space-based technologies and information to support sustainable development programmes in developing countries.

10. The present report describes the background, objectives and programme of the Workshop.

B. Programme

11. The programme of the Workshop was developed jointly by the Office for Outer Space Affairs, the European Space Agency, the Ministry of Science and Technology of Viet Nam and the Vietnamese Academy of Science and Technology.

12. The programme consisted of seven technical sessions focusing on the following themes: (a) national, regional and international initiatives and experiences in the use of space technology for forest management and environmental monitoring; (b) space-related technologies and informational resources for addressing forest management, environmental sustainability and disaster management; (c) use of space technology for reducing the impact and risk of deforestation, forest fires and land degradation; (d) capacity-building, education and training in the area of the application of space technology for effective forest management and environmental protection in the region; and (e) case studies on the successful application of space technology in forestry and environmental protection in developing countries of the region.

13. In addition, the programme included two working group discussion sessions and a one-day technical visit to research facilities of the Vietnamese Academy of Science and Technology and the Vietnamese satellite ground receiving station.

14. At the opening of the Workshop, introductory and welcoming statements were made by representatives of the Ministry of Science and Technology of Viet Nam, the Vietnamese Academy of Science and Technology, the Office for Outer Space Affairs, the European Space Agency and the local organizing committee.

15. A total of 38 technical presentations were made by speakers from both developing and industrialized countries over four days. All papers presented focused on successful applications of space technologies and space-related information resources providing cost-effective solutions or essential information for planning and implementing programmes or projects in the area of forest resources monitoring and environmental protection that could help to reduce environmental vulnerability in developing countries in the Asia-Pacific region. The Workshop also featured presentations on the needs of end-users engaged in managing forest resources and environmental protection and on ways of reducing the occurrence of forest-related disasters through the use of space technology, as well as on international and regional cooperation and capacity-building initiatives required for successful implementation of sustainable development programmes in developing countries.

16. Each technical session was followed by an open discussion focusing on specific topics of interest and provided additional opportunities for participants to voice their opinions. In-depth discussions were pursued and summarized by two working groups established by participants to develop ideas and proposals for possible follow-up actions.

17. A detailed programme of the Workshop and its proceedings, together with the list of participants, are available on the website of the Office for Outer Space Affairs (<http://www.unoosa.org>).

C. Attendance and financial support

18. The United Nations, on behalf of the organizers, invited developing countries in the Asia-Pacific region to nominate candidates to participate in the Workshop. Participants were required to have a university degree or well-established professional experience in a field related to the overall theme of the Workshop. In addition, participants were selected on the basis of their working experience in programmes, projects or enterprises that already used space technology applications or that could potentially benefit from using space technology. The participation of specialists at the decision-making level of both national and international entities was particularly encouraged.

19. Funds allocated by the co-sponsors for the organization of the Workshop were used to provide the financial support required for the participation of 19 participants from 14 developing countries of the region. A total of 18 participants received full financial support (including international air travel and daily subsistence allowance for the duration of the Workshop), and one participant received the partial support of daily subsistence allowance only.

20. The hosting organizations, the Ministry of Science and Technology of Viet Nam and the Vietnamese Academy of Science and Technology, provided conference facilities, secretarial and technical support, daily transfer from hotel to the venue of the Workshop, and transportation to and from the airport, in addition to organizing a number of social events for all participants of the Workshop.

21. The Workshop was attended by more than 80 participants from the following 17 countries: Afghanistan, Bangladesh, Cambodia, Canada, China, France, Indonesia, Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Myanmar, Pakistan, Philippines, Sri Lanka, Switzerland and Viet Nam. The following United Nations entities and international organizations were also represented: the Office for Outer Space Affairs, the Food and Agriculture Organization of the United Nations, the European Space Agency and the Space Generation Advisory Council.

II. Conclusions of the Workshop

22. Following deliberations at the Workshop's technical sessions, two working groups were established by participants to consider issues and concerns in the thematic areas, discuss potential solutions using space technologies, develop the observations and recommendations of the Workshop and work out project ideas for possible follow-up actions. Two sessions of the working groups were organized to pursue that agenda and define a framework for a mechanism for regional or international cooperation.

23. Participants expressed the general concern that for years countries of the Asia-Pacific region had witnessed the uncontrolled exploitation of forests, coupled with frequent forest fires. Deforestation thus caused contributed to land degradation, the loss of biodiversity and the destruction of local ecosystems, as well as to landslides during the rainy season, which led to the damage of property and the loss of human lives.

24. Participants noted that having good monitoring systems in place, including forest cover maps, was an essential requirement for identifying and mitigating existing and potential threats to forests. Such maps, in combination with satellite images, could be used to monitor the sustainability of forest ecosystems and estimate forest biomass according to country, ecological zone, climate region or other terrestrial characteristics. Geographical information systems were very useful in organizing and combining the various types of information necessary to manage forests.

25. Participants emphasized that the periodic and systematic observations provided by space technology, in particular satellite remote sensing, were very important in promoting the sustainable development and exploitation of forests. Space-based remote sensing offered the data needed for an up-to-date and objective inventory of every area of the Earth. It would not be possible, or affordable, to obtain such data through ground surveys, due to the remoteness of the observed sites and the cost associated with ground surveys. Satellite remote sensing, complemented by other applications, had proved its cost-effectiveness in conducting time-series and large-scale observations of the Earth's systems.

26. Deliberations of the working groups also underlined that applications of space technology were very relevant to the efforts undertaken by developing countries in the area of forest management and environmental protection and that those technologies could give great support to sustainable development programmes in the region.

27. The discussions of Working Group 1 focused on training and capacity-building required for effective use of space technology for forest management and environmental protection. The Working Group considered issues such as the type and the level of training and education programmes necessary for using space technology applications for environmental issues; public awareness initiatives; development of awareness among policy- and decision makers; and accessing financial resources and donors.

28. The Working Group expressed its appreciation for the efforts made by co-sponsors of the Workshop in arranging the meeting and recommended that the United Nations and the European Space Agency, in cooperation with relevant national institutions, should continue the development and organization of training programmes in various fields related to natural resources management for specialists from developing countries in the region.

29. The Working Group also requested that consideration be given to the possibility of organizing a one-week training course on microwave remote sensing applications for monitoring environmental resources, given that general weather conditions in the region sometimes diminished the quality of data received from optical instruments.

30. Further, the Working Group expressed the concern that the capacity in space technology applications of certain countries in the region was well below the appropriate level due to the current political and economical situation in the region and discussed ways to improve the quality of human resources in those countries in order to increase the capability of institutions involved in the monitoring and management of natural resources and to utilize modern technology.

31. Working Group 2 considered the availability and effective use of space data and tools for forest management and environmental protection and discussed project ideas and proposals of common interest and relevance on which participants could work jointly and could share their expertise and resources.

32. The Working Group agreed that the Land Cover Classification System (LCCS) developed by the Food and Agriculture Organization could serve as a general framework for potential pilot projects as it would help to harmonize data and to convert spatial information into a common system. For those reasons, LCCS would provide advantages for the acquisition of data and would facilitate data standardization, regional and global reporting and the integration of land use information.

33. The Working Group discussed in total 12 project proposals in thematic areas such as environmental hazards (including land use/land cover change in relation to landslides and flash floods), the development of forest fire early warning systems, national forest inventories and the monitoring of shifting cultivation in mountain areas. The participants also agreed that projects were to be carried out through a network of national teams established at the Workshop and at minimum cost by utilizing the existing facilities and resources of participating institutions.

34. Overall, the discussions of Working Group 2 highlighted the fact that problems involving forest management and forest-related environmental hazards were increasingly becoming major concerns of the countries in the region. Participants recognized that regional cooperation was a key element for addressing those issues properly and with the minimal resources available in most countries.

35. The reports of the working groups were adopted by the participants of the Workshop at the closing session. Also in the closing session, participants expressed their appreciation to the Government of Viet Nam, the United Nations and ESA for organizing the Workshop and for the significant support provided.

III. Follow-up actions

36. The Workshop provided an excellent opportunity to facilitate support for the increased use of space technologies for sustainable development in developing countries in the Asia-Pacific region. The pilot projects and actions identified by the working groups would provide guidance on how the institutions to which participants belonged could work together through regional partnerships.

37. The Office for Outer Space Affairs should monitor progress in implementing the projects and coordinate the actions undertaken by national teams. The Office should also facilitate an exchange of information between national teams and consolidate the partnership established at the Workshop.

38. Implementation of those projects would eventually result in the improvement of national and regional coordination mechanisms for matters related to forest management and environmental protection, as well as in the strengthening of the capacities of developing countries to respond to forest-related environmental hazards and the enhancement of international cooperation in that area.