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**Committee on the Peaceful
Uses of Outer Space**

**United Nations/Islamic Republic of Iran Regional
Workshop on the Use of Space Technology for
Environmental Security, Disaster Rehabilitation and
Sustainable Development**

(Tehran, 8-12 May 2004)

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I. Introduction

A. Background and objectives

1. In its resolution entitled “The Space Millennium: Vienna Declaration on Space and Human Development”,¹ the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) recommended that activities of the United Nations Programme on Space Applications promote collaborative participation among Member States at both the regional and the international level by emphasizing the development of knowledge and skills in developing countries and countries with economies in transition.
2. At its forty-sixth session, in 2003, the Committee on the Peaceful Uses of Outer Space endorsed the programme of workshops, training courses, symposiums and conferences planned for 2004.² Subsequently, the General Assembly endorsed the United Nations Programme on Space Applications for 2004 in its resolution 58/89 of 9 December 2003.
3. Pursuant to General Assembly resolution 58/89 and in accordance with the recommendation of UNISPACE III, the United Nations/Islamic Republic of Iran Regional Workshop on the Use of Space Technology for Environmental Security, Disaster Rehabilitation and Sustainable Development was held in Tehran from 8 to 12 May 2004. Organized by the Office for Outer Space Affairs of the Secretariat, within the framework of the United Nations Programme on Space Applications, and the Iran Space Agency of the Islamic Republic of Iran, the Workshop was co-sponsored by the European Space Agency (ESA). It was co-organized by the secretariat of the International Strategy for Disaster Reduction, the Food and Agriculture Organization of the United Nations, the Office of the United Nations High Commissioner for Refugees, the United Nations Educational, Scientific and Cultural Organization (UNESCO) and ESA, and was hosted by the Iran Space Agency.
4. As space technologies play a vital role in the areas of natural resource management, environmental monitoring and disaster management, the Office for Outer Space Affairs has identified those topics as priority thematic areas in which greater use of space-based solutions in developing countries can be promoted. Through regional workshops, expert meetings, pilot projects and training opportunities, the United Nations Programme on Space Applications has been implementing a space technology and disaster management programme and a natural resource management and environmental monitoring programme to assist developing countries in adopting space-based solutions for solving environmental and disaster-related issues.
5. To support developing countries and countries with economies in transition in incorporating space-based solutions for solving environmental and disaster-related issues, the Office organized six workshops (five regional workshops and one final international workshop, which brought together experts from all five regions), from 2000 to 2004, on the use of space technology for disaster management, bringing together practitioners and space agencies that had already developed space technology-based solutions and also experts from disaster management institutions.

6. The discussions held at the workshops organized so far have indicated that disaster management and reconstruction, environmental security and sustainable development are all interrelated and consequently can benefit from the same space technology solutions. For that reason, it was necessary to build further upon the results of the previous regional workshops by bringing together a group of experts to discuss and define a regional strategy with recommendations on how to take advantage of current space-based solutions to support environmental security, disaster rehabilitation and sustainable development. Furthermore, the conclusions reached at the workshops indicated that in the planning of post-disaster rehabilitation activities, consideration should also be given to post-conflict reconstruction activities and refugee support.

7. Several studies have indicated that scarcity of natural resources can contribute to emerging conflicts. With a current world population in excess of 6 billion and a medium projected population of 10 billion by 2050, it is clear that the stresses that are already being placed on existing natural resources will increase to a point where they are no longer sustainable. A key consideration then, in particular for reconstruction and development, is sustainable development. "Sustainability", as defined by the World Commission on Environment and Development, emphasizes that humanity must meet the needs of the present without compromising the ability of future generations to meet their own needs (A/42/427, para. 27). Societies must take into account the short- and long-term economic, environmental and technological resources available to them so as to ensure the optimal level of interaction among the three systems.

8. Additionally, globalization, understood as the increased mobility of goods, services, labour, technology, capital and ideas throughout the world, has for many people brought a realization of the interdependent nature of the world system. People are mutually dependent on one another for food, goods and services, health and environmental security. Ongoing conflicts and other humanitarian crises stress the transboundary nature of problems such as international drug dealing, trafficking in persons, illegal arms sales, famine, the vulnerability of oil pipelines, international terrorism and water scarcity. Transboundary water management is a definite challenge. Integrated management of water resources is limited and there are differing levels of awareness in relation to the political, cultural and social aspects related to the use of water.

9. Disaster management and sustainable development experts need to be at the centre of evaluation and planning activities in the core areas of early warning, preparedness and immediate and long-term response systems. Solutions that build upon existing space-based technology have important contributions to make in relation to managing oil, water and other natural resources, together with enhancing protection from pollution and military debris (such as chemicals and mines). As a consequence, such solutions directly support environmental security, disaster rehabilitation and sustainable development. In a globalizing world, risk reduction is an essential element in building competitiveness and a basis for sustainable development.

10. The overall objective of the Workshop was to demonstrate the successful use of space technology in the areas of environmental security, natural and related hazards, disaster rehabilitation, post-conflict reconstruction, refugee support and

sustainable development and to bring together a panel of experts to focus on specific aspects of space technology that can be applied to those areas.

11. The specific objectives of the Workshop were to increase awareness of the potential benefits of using space technologies in the above-mentioned areas among managers and decision makers dealing with environmental issues and disaster-related problems; to build an understanding of the types of information and communication needed in activities dealing with the above areas and the extent to which those needs could be met by space technologies; to strengthen existing regional networks; and to develop a plan of action with recommendations that would guide the incorporation of the use of space technologies in the above areas. It was also expected that, as a result of the Workshop, action would be taken in the short term that could lead to the launching of one or more activities in which interested national institutions could define and incorporate the use of space technologies in one of the above areas; and to design and establish a regional database to share knowledge and data on the environment and on disasters and their sound management and monitoring.

B. Programme

12. At the opening session of the Workshop, statements were made by the Minister for Communication and Information Technology of the Islamic Republic of Iran, the President of the Iran Space Agency and the representative of the Office for Outer Space Affairs. Representatives of the Iranian Meteorological Organization, the Ministry of Energy of the Islamic Republic of Iran, the California Institute of Technology, the Regional Service of Image Treatment and Remote Sensing (SERTIT) and the Office for Outer Space Affairs delivered the keynote presentations. A total of 25 presentations were made in the six thematic sessions and 13 during the open session. All the presentations contributed to building an understanding of the use of space technology for sustainable development, environmental security and crisis management, and post-disaster rehabilitation and reconstruction. Additionally, two discussion panels were held on “Building upon success stories and limitations for further use” and “The use of space technology in Asia: a vision forward”. Four discussion sessions enabled further deliberation on the main topics and led to the development of a common strategy aimed at increasing the use of space technology in the region.

C. Attendance

13. A total of 120 participants from the following 23 countries attended the workshop: Afghanistan, Armenia, Australia, Azerbaijan, Bangladesh, Egypt, France, India, Iran (Islamic Republic of), Iraq, Jordan, Lebanon, Nepal, Netherlands, Pakistan, Qatar, Russian Federation, Sudan, Syrian Arab Republic, Turkey, United States of America, Uzbekistan and Yemen. The United Nations Development Programme, UNESCO and the Office for Outer Space Affairs were also represented.

14. Funds allocated by the United Nations and by the co-sponsor (ESA) were used to defray the costs of air travel and daily subsistence allowance of 16 participants and 2 representatives of the Office for Outer Space Affairs.

II. Summary of presentations

15. The six thematic sessions focused on building an understanding of current user needs, the institutional environment and the available space-based solutions. The two discussion panels provided an ideal forum for discussing a vision forward for the use of space technology in Western and Central Asia and also Eastern Europe, focusing on current trends, new innovative developments and initiatives and also institutional aspects that should be further considered. Building upon what had been presented during the thematic sessions and by the participating panellists of both discussion panel sessions, participants defined, during four discussion sessions, a common strategy for the region, which resulted in the development of the “Tehran Initiative” (see annex).

16. The keynote addresses highlighted existing initiatives that would support or complement the development of applications of space-based technologies in the region and focused on those needs which could be met using space technologies, that is, those for which observation from space either should be unique or could bring substantial advantages over other data-collecting techniques. A number of examples were provided on the use of space technology in the area of land use and land cover change, in habitat fragmentation and in the area of hazards such as landslides, flooding, earthquakes and fire.

17. Several presentations updated participants on the work being carried out within the framework of the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (International Charter “Space and Major Disasters”), a mechanism that gives countries access to satellite imagery to help deal with an emergency. It was noted that since its implementation in November 2001, the Charter had been activated a total of 47 times. In particular, the presentation on the results of the activation of the Charter for the earthquake in Bam, Islamic Republic of Iran, demonstrated that such information, when provided in a timely manner, could be crucial in the mobilization of resources and the first step in the rehabilitation phase.

18. Participants were informed of the wide availability of remotely sensed images with various spatial, spectral and temporal resolutions. A number of examples of ongoing research studying the relationship between climate, natural hazards and environmental vulnerability were provided and the need to consider building integrated solutions that made use of data obtained from different sensors was stressed. Such data are particularly useful when combined with ground-based data and information and integrated into geographical information systems (GIS) for analysis and modelling of complex scenarios.

19. The various presentations that discussed space technology and sustainable development contributed to building an understanding of the linkages between sustainable development and disaster management as well as to defining actions that in the long term would contribute to improved disaster management. The following factors were mentioned: the need to develop spatial data infrastructures to facilitate data-sharing for effective disaster management; the importance of space-based data for the study of the sustainability of resources; the need to strengthen capacity-building; the added advantage of having access to high-resolution images; and the need for access to low-cost software solutions.

20. Eight presentations at both sessions focused on crisis and disaster rehabilitation and reconstruction, with examples of the successful use of space technology to deal with several types of hazard—earthquakes, cyclones, land degradation, floods, extreme weather conditions, forest fires, volcanoes and drought. The importance of portable communication systems during emergency response and rehabilitation was stressed. Several recommendations were put forward, including the need to bridge the gap between the space technology community and the decision makers; the need to consider disasters that resulted from or were aggravated by conflict; the need to support projects that contributed to developing methodologies that would enable the early warning of disasters (including the prediction of seismic activity); the need to set up portable communication systems before disaster struck in order to guarantee that they were available when needed; and the need to develop telemedicine solutions to support disaster relief and disaster rehabilitation.

21. The sessions that focused on environmental security provided an opportunity to understand the contribution of space technology in that area, with presentations that provided insight into diverse areas such as water resource management (as a transboundary issue), conflicts, food security, natural resource management and environmental change. The presentations provided discussion points that contributed to the discussion sessions, including the following:

(a) There should be safeguards specifically for the environment, similar to those in the Geneva Conventions;

(b) Space technology applications, in particular within the European Union, were being used increasingly to support the enforcement of international treaties, conventions and protocols related to the environment, of which there were more than 240;

(c) Areas where space technology did have a proven role were the tracking of chemical products, clean-up activities, the monitoring of wetlands and management of protected areas;

(d) New agreements were needed concerning standards for data in order to improve information-sharing and also to contribute to enforcing compliance with current and future international agreements related to environmental security issues.

22. The first panel, which discussed current limitations on the further use of space technology and the possibility of building upon successes, provided rich insight into the many success stories that demonstrated the added advantage of incorporating space-based technologies. The panellists discussed constraints to the further use of space technology and agreed that the following limitations should be dealt with on a priority basis:

(a) The need to define exactly the types of data needed for disaster management so as to optimize data collection and archiving;

(b) The need to develop effective solutions and policies for effective data-sharing at both the regional and the local level;

(c) The need to establish and strengthen regional cooperation before disaster struck;

(d) The need to transfer knowledge to the end-user at the community level.

23. The second discussion panel focused on a vision forward for the use of space technology in Asia, more specifically ongoing and planned initiatives, the steps forward that should be taken together, new and emerging technologies and solutions, and strategies for increasing networking among regional and national institutions. Panellists emphasized several issues: the need for free data-sharing; the need for regional cooperation; the need to develop solutions and programmes for local communities; the need to help managers and decision makers better understand the potential of space-based technologies; the need to tackle the knowledge gap between institutions, suggesting that institutional exchange programmes should be implemented; and the need to build sustainable regional and national infrastructure for space application through more research and development programmes.

24. The presentations that were made at the Workshop are available on the website of the Office for Outer Space Affairs (www.oosa.unvienna.org/SAP/stdm).

III. Observations and recommendations

A. Approach to establishing a regional strategy

25. Participants were divided into three groups on the basis of their areas of expertise and interest: environmental security, disaster rehabilitation and sustainable development. During four discussion sessions, each group discussed activities that would contribute to an increase of the use of space technology in the region. Each group focused on three areas: capacity-building, existing information and technology and the constraints and opportunities inherent in the current institutional environment. Participants also discussed the format for a regional network that would enable the creation of partnerships and a regional database that would contribute to the sharing of knowledge and data.

B. A Tehran initiative

26. During the discussion sessions, participants focused on several points, reaching agreement on recommendations that together would shape a strategy for action, which would constitute a framework for the effective utilization of space-based technologies in Western and Central Asia as well as in Eastern Europe. The framework that was agreed upon by all participants is the Tehran Initiative (see annex), which provides guidance focusing on data access, spatial data infrastructures, networking, coordination of national and regional space policies, raising awareness and building upon existing initiatives.

27. Participants recognized that knowledge-sharing and the establishment of partnerships would be greatly facilitated by the creation of a regional task force of focal points, which would form a network of institutions with responsibility for disseminating information on activities and information that could benefit all the institutions involved. The Iran Space Agency offered to coordinate such a task force.

C. Role of the Office for Outer Space Affairs

28. The Workshop provided a unique opportunity to channel support for the further use of space technologies in the Islamic Republic of Iran and in the region. The Tehran Initiative provides guidance on how institutions can work together through regional partnerships. The Office for Outer Space Affairs should provide support in the consolidation of the partnerships that were formed in Tehran, which will result in the sharing and transfer of knowledge and the development of joint activities, in particular through the creation and strengthening of the regional task force of focal points. Additionally, the Office should continue its work on capacity-building through the regional centres for space science and technology education, affiliated with the United Nations, and work further towards ensuring that available data sets reach the end-user.

Notes

¹ *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.

² *Official Records of the General Assembly, Fifty-eighth Session, Supplement No. 20 (A/58/20)*, para. 75.

Annex

The Tehran Initiative

Adopted at the United Nations/Islamic Republic of Iran Regional Workshop on the Use of Space Technology for Environmental Security, Disaster Rehabilitation and Sustainable Development, held in Tehran from 8 to 12 May 2004

1. The United Nations/Islamic Republic of Iran Regional Workshop on the Use of Space Technology for Environmental Security, Disaster Rehabilitation and Sustainable Development was organized jointly by the Office for Outer Space Affairs of the Secretariat and the Iran Space Agency on behalf of the Government of the Islamic Republic of Iran, and co-organized by the secretariat of the International Strategy for Disaster Reduction, the Food and Agriculture Organization of the United Nations, the Office of the United Nations High Commissioner for Refugees, the United Nations Educational, Scientific and Cultural Organization and the European Space Agency. A total of 120 participants from the following 23 countries attended the Workshop: Afghanistan, Armenia, Australia, Azerbaijan, Bangladesh, Egypt, France, India, Iran (Islamic Republic of), Iraq, Jordan, Lebanon, Nepal, Netherlands, Pakistan, Qatar, Russian Federation, Sudan, Syrian Arab Republic, Turkey, United States of America, Uzbekistan and Yemen. The aim of the Workshop was to discuss the use of space technologies in the areas of environmental security, disaster prevention, management and rehabilitation, post-conflict reconstruction, refugee support and sustainable development. The Workshop was hosted by the Iran Space Agency and held in Tehran from 8 to 12 May 2004.

2. Recognizing that space technologies play important roles in the above-mentioned areas, participants made a number of observations and recommendations, which are presented below.

A. Data access

3. Participants recognized that, although a significant quantity of spatial data (more specifically data obtained from space-based sensors) was widely available, information concerning what spatial data were available was not common knowledge. In order to contribute to making such information available, participants recommended that each institution maintain a web page with links to websites that had information on freely available data, including links to the web pages of partner institutions. In that context, priority should be given to baseline data for disaster preparedness and mitigation of natural hazards. In the same spirit, participants welcomed the offer of GIS Development (www.gisdevelopment.net/) to set up a "warehouse" (electronic library) to facilitate the sharing of the findings and experience of different regional and national institutions, including recommendations on how to set up such a data warehouse in institutions in their respective countries to facilitate data exchange. With specific reference to the AsiaCover initiative (www.asiacover.org), participants recommended that Member States in the region support the implementation of the initiative in order to ensure

the consolidation of a spatial database for each country that could be made publicly available and widely shared.

B. Spatial data infrastructures

4. Participants recognized the importance of spatial data as the backbone of planning, decision-making and regional development, as well as the need for spatial data in connection with environmental security, sustainable development and disaster rehabilitation. Consolidation of national spatial databases should be carried out in a coordinated manner through the implementation of a national spatial data infrastructure. The participants recommended that Member States give priority to establishing their national spatial data infrastructures with all the necessary components (international and national standards, metadata, clearing house, national database). The content of the core data sets should be defined by a collective effort of all spatial data stakeholders in the country. Additionally, participants stressed that, in producing spatial data, institutions should take into consideration existing commonly used data standards to facilitate the sharing of data (content and structure).

C. Capacity-building

5. Participants recognized the need for the continuous building of national and regional expertise, through the provision of long- and short-term training and education at the regional centres affiliated with the United Nations, through programmes offered by the International Institute for Geo-Information Science and Earth Observation and other academic centres of excellence. In addition, participants stressed the need to make the existing educational opportunities available to a wider university community. They recognized the need for additional workshops building upon the results of the Workshop in Tehran, including workshops focusing on training decision makers (covering the integrated application of combined remote sensing, geographical information systems (GIS) and decision-support systems).

6. In order to enable knowledge-sharing, participants recommended that institutions implement institutional exchange programmes, providing opportunities for experts to visit and work with partner institutions. In particular, they recommended that institutions in the region make every effort to provide support to Iraqi and Afghan institutions through exchange programmes and technical support.

7. Participants recognized the importance of regional technical gatherings, such as Map Asia and Map India, the annual Asian Conference on Remote Sensing and the Inter-Islamic Network on Space Sciences and Technology, as well as meetings of other professional societies, as opportunities to share knowledge and gain further expertise.

D. Raising awareness

8. Participants recognized the need for continuously raising awareness of the usefulness of space-based technologies, recommending that such awareness-raising

begin with children in the education system as well as with the media. As an awareness-raising activity, participants also recommended that Member States promote World Space Week (4-10 October) in their respective countries. Additionally, participants stressed the need to focus on providing geo-information to and for people through greater community involvement.

E. Networking

9. Participants recognized that knowledge-sharing and the establishment of partnerships would be greatly facilitated through the creation of a regional task force of focal points, which would be responsible for disseminating information on activities and other information that could benefit all the institutions involved. The Iran Space Agency offered to take on a coordinating role of such a regional task force.

10. Furthermore, participants recommended that the regional task force of focal points set up a technical working group to review the status of geo-databases in the region and to define technical specifications for an Earth-observation-derived geo-database for disaster-prone areas in Western, Central and South Asia. Additionally, they recommended that the task force establish a web page where useful information could be posted by contributing institutions; create a discussion list to be circulated by electronic mail (e-mail) to facilitate the exchange and dissemination of information; and hold periodic meetings. The offer by GIS Development to host such a web page and to set up the web-based discussion list was welcomed, as was the offer by the Government of Azerbaijan to host a follow-up workshop.

F. National and regional space policies

11. Participants noted the need for a coordinated approach to the incorporation and use of space-based technologies in the region and recommended that Member States implement national plans for the incorporation of space-based technologies and participate in existing mechanisms that contributed to the establishment of regional and global policies such as the Regional Space Applications Programme for Sustainable Development of the Economic and Social Commission for Asia and the Pacific and in the work of the Committee on the Peaceful Uses of Outer Space and its two subcommittees. Furthermore, they recognized the need to include research and development as an integral part in all national space policies and to guarantee the involvement of the private sector and non-governmental organizations.

G. Demonstrating the use of space technology and building upon existing initiatives

12. Participants recognized that there were a number of ongoing initiatives that should be taken advantage of and recommended that institutions build upon the opportunities provided by such initiatives when proposing new projects and activities, which should take into consideration the need for solutions that integrated different space-based technologies and disciplines and also the possibility of

focusing on watersheds as a homogeneous area for planning and decision-making purposes (owing to the transboundary nature of most issues that are successfully dealt with using space-based technologies).
