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COMMITTEE ON THE PEACEFUL
USES OF OUTER SPACE

REPORT ON THE UNITED NATIONS/INTERNATIONAL ASTRONAUTICAL FEDERATION WORKSHOP ON SPACE TECHNOLOGY FOR HEALTH CARE AND ENVIRONMENTAL MONITORING IN THE DEVELOPING WORLD, CO-SPONSORED BY THE EUROPEAN SPACE AGENCY, THE COMMISSION OF THE EUROPEAN COMMUNITIES AND THE GOVERNMENT OF NORWAY AND HOSTED BY THE NORWEGIAN SPACE CENTRE

(Oslo, 28 September-1 October 1995)

CONTENTS

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INTRODUCTION

A. Background and objectives

1. The General Assembly, in its resolution 37/90 of 10 December 1982, endorsed the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82) that the United Nations Programme on Space Applications should promote the growth of indigenous nuclei and an autonomous technological base in space technology for developing countries. At its thirty-eighth session, in June 1994, the Committee on the Peaceful Uses of Outer Space endorsed the United Nations Programme on Space Applications for 1995, as recommended by the Scientific and Technical Subcommittee at its thirty-first session. Subsequently, the General Assembly, in resolution 49/34 of 9 December 1994, endorsed the activities of the Programme on Space Applications for 1995.

2. The present report contains a summary of the proceedings of the United Nations/International Astronautical Federation Workshop on Space Technology for Health Care and Environmental Monitoring in the Developing World. Organized as part of the 1995 activities of the Office for Outer Space Affairs of the United Nations and its Programme on Space Applications, the Workshop was the fifth in a series conducted by the United Nations, and was held in conjunction with the 46th Congress of the International Astronautical Federation (IAF) at Oslo, Norway. Previous symposia and workshops in the series have been held in Austria, Canada, Israel and the United States of America.

3. The main objective of the Workshop was to provide participants with information on the possibilities offered by current space technologies and to discuss ways in which they could be used in ongoing or planned programmes and projects of the participants.

4. During the course of the Workshop successful models of space applications were presented. Through panel discussions, the Workshop developed general principles on how developing countries could use space technologies, including remote sensing and space communications systems for health care, environmental monitoring and economic and social development.

5. The present report covering the background, objectives and organization of the Workshop, as well as the observations and recommendations made by the participants, has been prepared for the Committee on the Peaceful Uses of Outer Space and its Scientific and Technical Subcommittee. Participants will report to the appropriate authorities in their own countries.

B. Participants

6. The United Nations invited developing countries to participate in the Workshop. Participants were required to have university degrees in engineering, physics, biological or medical sciences or other fields related to the themes of the Workshop. The participants were working in programmes, projects or enterprises in which space technology could be utilized. A few policy makers, at a decision-making level, from both national and international entities were also invited.

7. Funds allocated by the United Nations, IAF and the other co-sponsors for the Workshop were used to cover international air travel and per diem expenses for the period of the Workshop and the IAF Congress for selected participants from developing countries.

8. The following Member States and international organizations were represented at the Workshop: Bangladesh, Brazil, Cambodia, China, Costa Rica, Cuba, Egypt, Ethiopia, Ghana, India, Indonesia, Iran (Islamic Republic of), Jordan, Mauritania, Mauritius, Nicaragua, Nigeria, Peru, Philippines, Senegal, Sierra Leone, Sri Lanka, Syrian Arab

Republic, Thailand, Togo, Uganda and Viet Nam; Office for Outer Space Affairs of the United Nations and World Health Organization (WHO); and Commission of the European Communities, European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), European Space Agency, European Telecommunications Satellite Organization (EUTELSAT), International Astronautical Federation, International Mobile Satellite Organization (Inmarsat), International Space University (ISU) and International Telecommunications Satellite Organization (INTELSAT). Speakers, chairmen and participants from Austria, Canada, France, Germany, Italy, Malta, Netherlands, Norway, United Kingdom of Great Britain and Northern Ireland and the United States of America also took part in the Workshop.

I. PRESENTATIONS AND DISCUSSIONS DURING THE WORKSHOP

A. General themes

9. The Workshop featured a series of presentations on relevant space application fields by experts from both developed and developing countries. A representative from each of the developing countries presented outlines of its national programme. Three panel discussions preceded open discussion sessions where the participants interacted, providing information, comments, questions, recommendations and suggestions.

10. It was stressed repeatedly during the meeting that the problem with adopting space technology in developing countries was not with the technology itself, which existed and was readily available. The problems were regulatory, legal, political, institutional, financial and educational. It was suggested that a future UN/IAF workshop might focus on that matter and make recommendations to reduce those problems.

11. The value of space technology to developing countries was clearly recognized by the participants, as was the necessity for stronger regional cooperation and collaboration. It was also recognized that there was a strong need for more extensive education in the benefits of space technology at all levels, from school children to political leaders. In particular, school children should be taught subjects related to space science and technology which were most likely to be relevant to the country in future.

12. Space technology had become an increasingly vital part of everyday life, characterized by growing costs and complexity, which meant that most developing countries must be extremely selective about the scope and pace of their own space activities. It had been realized that space technology could be a valuable tool for enhancing international security.

13. For example, a proposal for the use of a constellation of geosynchronous equatorial and polar orbiting satellites, the Global Satellite Network for Education, Tele-health and Disaster Management (GLOSNETAD), was outlined. GLOSNETAD would be connected by a network of ground stations as a global arrangement for education, health care and disaster management,

14. The ever-increasing cost of space technologies and participation in space activities made international cooperation absolutely necessary for many countries wishing to benefit from the technology. The need for international cooperation was therefore repeatedly stressed.

B. Telehealth

15. Space technology provided entirely new dimensions to the way in which health care and education could be delivered. Conventional approaches required a face-to-face relation between the patient and the health-care provider. That generally meant that patients in remote areas had very limited access to high-quality, specialized medical care. The telephone and two-way radio had improved the situation by permitting audio communication between health-care

persons in a remote area and specialists at a major centre. However, the equitable availability of high-quality medical care depended upon interactive audio-visual communication that could be provided by space communications technology.

16. Telehealth was the practice of health care using interactive audio, visual and data communication. It included health-care delivery, diagnosis, consultation, treatment, communication of data and education of both the doctor and the patient. Recent advances in technology, especially in video storage, processing, retrieval and transmission had helped to bring telehealth within the reach of a much broader community.

17. Telehealth was based on the fundamental premise that there should be equitable access to quality health care. The cost of health care was rising everywhere. As a function of a country's gross national product (GNP), the cost had shown a steady rise over the years. Expectations of health care also continued to rise. However, available resources were declining. Telehealth could slow the rate of cost increases. Moreover, it could help to achieve the goal of equitable access.

18. In about 50 projects that had been followed by WHO, it was found that there were significant savings in travel costs of physicians and patients. Telehealth had been successfully used for pathology, radiology, magnetic resonance imaging, cardiology and further medical consultations.

19. In China, the direct and active participation of medical universities in the use and promotion of space technology had been critical in public health education and medical instruction in remote areas. Interactive satellite transmission technology was one of the best and most reliable means of conveying health knowledge to medical workers in rural areas. Since 1993, the West China University of Medical Sciences had actively participated in developing radio and television programmes providing rural areas with basic information not only on health-care services, but also on epidemic diseases, thereby allowing timely mitigation strategies.

20. Financial and technological support from developed countries was one of the most important factors in successfully promoting the sharing of benefits of space technology to humankind. Developing countries should place a higher priority on the active participation in and application of space technology in the fields of health care and education. They should also improve their health care and educational organizations and infrastructures.

21. The HealthNet programme was developed in 1989 to cooperatively share information and communications services to support public health and medical research in the developing world. HealthNet was currently in operation in 15 African and 5 Asian countries.

22. The original intent was to use low Earth orbit (LEO) satellites to reach rural and remote areas. Five ground stations with a computer, radio and antenna had been established. The satellites were low cost and could be used for electronic mail, with delivery anywhere in the world within 12 hours.

23. In an effort to address the problem of the globally unbalanced provision of medical and educational services, participants in the ISU 1994 summer session programme at Barcelona developed a proposal to establish the Global Access to Tele-health and Education System (GATES). By using advanced communications and information technologies for telehealth and tele-education applications, GATES would improve basic medical care and education on a global scale.

24. The goal of the GATES project was to reduce inequalities in health and education within countries and between countries by using telecommunications technology. The unique aspects of the GATES system were that it took a global approach and it had the dual objective of combining health care and education. The dual approach was justified by the fact that the highest medical and educational needs generally appeared in the same areas. Furthermore, the basic communications requirements for health care and educational services were very similar.

25. Students working on that project were especially concerned with minimizing costs and keeping the infrastructure as simple as possible. They recognized that the largest problems were economic and political. An efficient management structure was proposed. Membership would be open to any country, but services would be available to anyone, regardless of membership. GATES would not only be used for health and education services, but also for environmental and disaster management applications.

26. The United Nations and other international organizations could influence policies that would result in the development of telehealth, distance education systems and further networks where they were needed. Current and future satellite systems could do much to rectify the gross knowledge imbalance that existed in many parts of the world. Regulatory, legal and political issues must be addressed and resolved if support services for health care and education were to be met. Those issues should not be permitted to inhibit the development of essential worldwide satellite services that were feasible.

C. Environmental monitoring and disaster management

27. Presentations on remote sensing focused on the opportunities for using satellite data for environmental monitoring. It was stated that developing countries would be able to utilize new developments in remote sensing systems to gain access to significantly greater quantities of valuable data. Presentations highlighted applications in areas such as forestry, geology and mineral resources, cartography and other fields. It was emphasized that compared with conventional ground surveys, satellite observations provided less detail but much greater economy, particularly when continuous and repetitive monitoring was required.

28. Although the European Remote Sensing (ERS) satellite system of ESA was not specifically planned to meet the needs of developing countries, its data played a vital role, in particular in the fields of environmental monitoring, food production and climate change. In that context it was emphasized that national aid agencies should substantially increase the use of satellite data in projects funded by them. They required, however, greater awareness of the potential of space technology for sustainable development.

29. Aid for food production and preservation of the environment was important not only for humanitarian reasons, but also because it benefits all the donors by cost savings and improved effectiveness in managing emergencies; it also contributed to world political stability. Space agencies benefited from involvement in aid projects in fields such as education by generating increased public and political interest and by demonstrating their usefulness in converting general policy statements into technical implementation.

30. The Workshop identified several areas where cooperation could be improved, such as an assessment of user requirements of the developing countries, accessibility of satellite data and information services at reasonable cost, promotion of well-designed pilot projects to assure transition to ongoing operational status, increased on-site education and training, provision of infrastructures for satellite data acquisition and better use of existing user interfaces. It was agreed that the Committee on Earth Observation Satellites (CEOS) would be the appropriate forum in which to discuss those issues.

31. MERCURE, a satellite-based communications capability donated to the United Nations Environment Programme (UNEP) by member States of ESA, was discussed during the Workshop. Six European countries had provided the space segment and 16 antennas with related hardware and software. It would provide UNEP with two different networks: subnet A, the backbone, using 7.3 m antennas providing 384 kilobytes per second (kb/s); and subnet B, for remote areas using 2.4 m antennas providing 64 kb/s.

32. UNEP currently transmitted about 6 million pages of data to approximately 3,000 users. Telecommunications costs had quadrupled over the past few years to the current level of US$ 4 million annually. The service based on MERCURE would be much more effective, and the cost to UNEP would be only US$ 6 million over a period of four

years. The backbone system would be based on 64 channels, each of which would have a capacity of 384 kb/s. Two INTELSAT satellites - one over the Atlantic Ocean and the other over the Indian Ocean - would be used.

33. The MERCURE system would also provide much wider access to the Internet in Africa, and facilitate much more efficient dissemination of documents, environmental data, images and messages, resulting in substantial savings in telecommunications costs.

34. The Tropical Ecosystem Environment Observation by Satellite (TREES) project was sponsored by the Joint Research Centre of the Commission of the European Communities and ESA. Its main objectives were the development of techniques for a global tropical forest inventory using data from the advanced very high resolution radiometer (AVHRR) of the United States of America as well as from the ERS-1 satellite; the development of techniques for the detection and monitoring of active deforestation areas and measuring deforestation rates in critical areas; and the development of a comprehensive Tropical Forest Information System to support the modelling of tropical deforestation dynamics.

35. The baseline assessment of tropical forest cover using AVHRR had been completed. Synthetic aperture radar (SAR) data over 18 selected areas had been examined with a view to investigating the feasibility of vegetation mapping with ERS-1. In the future, research methodologies would be tested for monitoring deforestation, and other data sources, such as SPOT and ATSR-2, would be examined.

36. In 1992, the Panamazonia Project was proposed with the objective of developing a system for monitoring the tropical forest in Latin America using satellite remote sensing. An experienced technical team was selected from agencies in Bolivia, Brazil, Chile, Colombia, Ecuador, French Guyana, Peru and Venezuela. Visible, near-infrared and short-wave infrared images had shown significant environmental damage as a result of deforestation. It was anticipated that, in the near future, the Panamazonia Project would also provide data on the exploitation of mineral resources.

37. Considering the magnitude of the losses caused by natural disasters and recognizing the need for a global initiative, the United Nations proclaimed, by resolution 44/236 of 22 December 1989, the 1990s the International Decade for Natural Disaster Reduction

38. Whereas natural disasters included floods, earthquakes, hurricanes, landslides and certain types of widely spreading infectious diseases, human-induced disasters included explosions, armed conflicts, motor and aircraft accidents, chemical spills etc. Forest fires could be of either category.

39. Space technology offered tremendous potential for assisting in disaster response and mitigation. Telecommunications satellites addressed issues related to mass awareness, warning, education and training, as well as emergency communication in the event of a disaster. Remote sensing satellites were useful in formulating disaster mitigation measures and in monitoring, and could assist in risk analyses by promoting understanding of the processes that led to natural disasters.

40. A national risk assessment system was evolving in India to minimize the harmful effects of hazardous events. That was a national mission, integrating space applications along with other relevant information for disaster warning, disaster mitigation and efficient management of hazardous events. Unfortunately, only a few countries had the means to operationally utilize space technology for hazard management. Increasing access to space technology for such uses could be promoted through appropriate international coordination and cooperation.

41. Fire was the most common natural cause of forest destruction in Canada. Several projects were in progress to monitor the extent of such damage. The most advanced forest management information systems were those currently being used to enhance the effectiveness of fire-suppression activities. Many of those systems made use of satellite

remote-sensing data to categorize the fuel type, which was an important factor in determining the risk that a fire would spread. Combining the fuel type with other parameters enabled fire-suppression authorities to combat forest fires more effectively, thereby dramatically reducing annual losses and achieving significant savings in fire-suppression costs.

42. Several projects using remote sensing in North America were related to monitoring forest damage caused by forest fires and insect infestations. Decision support systems were being developed to provide risk assessment and management planning to minimize losses caused by insects. In many such projects, remote sensing was used as a tool to acquire information related to damage caused by insects. Geographic Information Systems (GIS) were used to perform spatial analyses and to produce risk maps in all of those projects.

II. OBSERVATIONS AND RECOMMENDATIONS

A. General themes

43. The importance of merging space technology with other conventional techniques was stressed throughout the Workshop. The space sector should therefore not be considered in isolation. Space technology in developing countries should be related to use by the public sector, namely for telecommunications, remote sensing, meteorology and navigation.

44. Space science should continue to play a vital role, as even a modest investment in that area could pay big dividends. Space science was well recognized as a valuable contributor to the advancement of technology, particularly in the area of data processing. Competence in space science contributed to competence in areas far beyond the specific field of research undertaken.

45. It was agreed that the Workshop would help to increase awareness of the status and possibilities of applications of space technology in developing countries. However, one impediment to the introduction of space technology in developing countries was the lack of awareness and understanding on the part of political leaders and senior officials, which often resulted in a lack of political will. To overcome that difficulty, it would be helpful to select a few good people who had been involved in successful programmes as "ambassadors" to developing countries. Their credibility would probably have a great impact.

46. It was important to balance space technology with the capabilities and resources of developing countries. Many aid projects provided expensive technology to developing countries that could not sustain such systems after the initial project was concluded. Fundamentally, every country must have its own policy to initiate and integrate space projects into its national programmes.

47. It was recommended that a step-by-step approach be taken to the introduction of space technology. Although there was already a large market in developing countries for space technology products, and opportunities existed for joint ventures, more consideration should be given to building up the infrastructure required to successfully implement space programmes.

48. The importance of having staff that were not only trained, but competent and confident in dealing with all aspects of the applications of space technology, was stressed. Technological advances must be accompanied by similar progress in the level of understanding of users. However, while national space coordinating bodies were needed at senior levels to set policy, not every country needed a space agency.

49. In order to facilitate the implementation of space programmes, international cooperation between developed and developing countries, as well as among developing countries themselves, still needed to be improved. It was

repeatedly recommended that the practical use of satellite data with emphasis being placed on developing simple-to-use and low-cost applications should be promoted in developing countries.

50. Better access to Internet services should be available for developing countries. Information on health, remote sensing and GIS was especially useful, and every institution interested in such information should have access to it.

51. There was a need for better standards and a more liberal approach to pricing in the area of commercial telecommunications. In that context, international organizations such as the International Telecommunication Union, but also the operators of local platform transmitter terminals (PTTs), should be encouraged to be more liberal in their pricing structures.

52. To achieve a national commitment to provide resources to space technology, a clear cost-benefit analysis for each project should be prepared for decision makers. Decision makers in developing countries must be convinced that a judicious expenditure of limited resources on space programmes would substantially contribute to social stability and economic growth.

53. The need was stressed for participants to pass on their experience to their colleagues, and in particular to decision makers in their home countries. Furthermore, participants should inform their local PTTs and industries of the discussions and results of the Workshop.

54. One of the future UN/IAF Workshops should focus on the means of overcoming the regulatory, legal, political, financial and educational obstacles to the better exploitation of space technology in developing countries.

55. The involvement of the private sector in such meetings should be increased. In particular, the participation of PTTs and medium-sized companies (of 20 to 100 employees), which could provide relatively low-cost technology and services to developing countries, should be encouraged.

B. Telehealth

56. The potential of space technology for improving traditional public health-care services was recognized by participants. Space technology had a vital role to play in enhancing medical services, medical consulta-tions and the monitoring of epidemic disease, particularly in remote and rural areas.

57. Recent improvements in satellite communications technology and information systems had resulted in a dramatic increase in telehealth programmes and projects worldwide. Linking remote locations to an urban medical centre provided an opportunity for specialist consultations that might not be possible otherwise. Thus, telehealth systems could reduce critical delays in the delivery of health care by providing and expanding access to remote areas.

58. Whereas some telehealth applications required real-time capability (video conferences for telesurgery, telepsychiatry etc.), other applications, such as image and file transfer, consultations or research, could be supported in a store-and-forward mode. In the future, telehealth using mobile satellite communications systems such as Inmarsat could form an integral part of national or regional emergency planning.

59. Developing countries should give higher priority to active participation in, and the application of, space technology in the fields of health care and education. They should also improve their health care and educational organizations and infrastructures.

60. The direct and active participation of medical universities in the use and promotion of space technology was critical in public health education and remote medical instruction.

61. The United Nations and other international organizations could influence policies leading to the development of telehealth and distance education systems where needed. Current and future satellite systems could do much to rectify the knowledge imbalance that existed in many parts of the world. However, not only technical, but also regulatory, legal and political issues must be addressed and resolved if support services for health care and education were to be developed. Those issues should not be allowed to inhibit the development of adequate, worldwide satellite services that were already feasible.

C. Environmental monitoring and disaster management

62. The unique capabilities of remote sensing satellites for providing comprehensive, synoptic and multi-temporal coverage of large areas at regular intervals had been and would be an indispensable tool for continuous environmental monitoring.

63. Although many developing countries had indigenous experts in space applications, it was nevertheless difficult for them to solve environmental problems on their own. Outside assistance and expert advice was therefore essential to the successful application of space technology for sustainable development.

64. A more effective coordination policy must be established in many developing countries in order to integrate satellite remote sensing into national, social and economic development programmes. There were examples of highly qualified individuals in well-equipped remote sensing laboratories who were not contributing to national plans because of the lack of communication with national policy makers and decision makers, who were thus not aware of the benefits that space applications could bring to national efforts to achieve sustainable development.

65. The pricing and independence of remote sensing data were critical for the integration of remote sensing into national programmes. Governments and agencies should therefore be encouraged to reduce prices on remote sensing data and to reduce copyright restrictions.

66. In connection with the joint TREES project of the Commission of the European Communities and ESA, a deforestation monitoring system should be developed, combining low- and high-resolution data and using the Tropical Forest Information System.

67. Only a few developing countries currently had telecommunications systems capable of coping with disasters. Furthermore, traditional telecommunications systems were often severely affected by disasters such as earthquakes, floods or hurricanes. Mobile satellite systems should therefore be used.

68. Voice, fax and data terminals should continue to be positioned at strategic locations so that an uninterruptible source of warning would be available even if the local radio or television infrastructure had been disabled by a disaster. A network of terminals would be particularly effective if it were connected to an appropriate regional or global database of GIS or of relevant disaster information.

69. In many developing countries, land mines presented a serious obstacle to social and economic development. The process of de-mining was very slow, tedious and dangerous. Thus, it was recommended that satellite remote sensing should be increasingly used in order to help affected developing countries deal with that problem in a more effective manner.

70. The continuous establishment of training centres would play a vital role in promoting and applying space technology for sustainable development. It was suggested that remote sensing and GIS training be combined into one national training centre. It was also recommended that such centres should train staff from different institutions, so as to encourage information sharing, reduce the amount of overlapping, and minimize the capital investment required.

Annex

PROGRAMME OF THE WORKSHOP

Date/Time	*Subject*	*Speaker/Country/ Organization*
Thursday, 28 September 1995		
0830-0900	Registration	
	Space technology applications: improving the quality of life	
0900-0945	Opening ceremony:	
	Opening statements	United Nations, ESA, IAF,
	Welcoming statements A. Mathisen,	State Secretary, Royal Ministry for Foreign Affairs of Norway
0945-1015	Keynote address: the challenge of space technology - possibilities to enhance Chairman, ISRO the quality of life	K. Kasturirangan (India),
1015-1045	Contribution of previous UN/IAF J. Hess (United States of America) workshops to current space activities in developing countries - a critical overview	
1045-1100	**Break**	
	Space technology for better health services	
1100-1130 S. H. Mandil (WHO)	Improving human conditions through telemedicine programmes: current state and future perspectives	
1130-1200	Use of satellites in telemedicine M. House (Canada) and health services	
1200-1230	Discussion	
1230-1400	**Lunch**	
	Space technology for a better and safer	

	environment	
1400-1430	Use of satellite data in environmental monitoring and planning national development - the role of ERS and ENVISAT	B. Bizzari (Italy)

Date/Time	*Subject*	*Speaker/Country/ Organization*
1430-1500	MERCURE project: a system developed for global environmental data transmission	H. Onsrud (Norway)
1500-1530	Utilization of the satellite telecommunication system MERCURE in UNEP: UNEPnet, the green lane on the Internet	A. Brox (UNEP)
1530-1545	**Break**	
	Establishing the necessary policies	
1545-1615	National and regional space competence - arriving at an appropriate mix of space and non-space technology	R. Gibson (United Kingdom of Great Britain and Northern Ireland)
1615-1800	First panel discussion	
	Establishing policies and institutional links to promote the use of space technology (followed by general discussion)	

Friday, 29 September 1995

Space technology in health-care programmes

0900-0930	Global Access Tele-health and Education System (GATES Project)	L. Stojak (International Space University)
0930-1000	Healthnet: solving communications problems for health-care workers	A. S. Brown (United States)
1000-1015	**Break**	
1015-1045	Providing health care between countries by Telemedicine - a case-study	G. Hartviksen (Norway)

1045-1115 Satellite communications technology for
C. Yongxin (China)

continuing public health education and
dissemination of information in rural areas

1115-1230 Brief presentations by the participants on the
theme of the session

1230-1400 **Lunch**

Date/Time	***Subject***	***Speaker/Country/ Organization***
1400-1545	Satellite systems in support of health-care services in remote areas, environmental	EUMETSAT, EUTELSAT
Inmarsat, INTELSAT		
	monitoring and disaster preparedness and response	
1545-1600	**Break**	
1600-1800	Second panel discussion	
	Perspectives for the use of space technology to enhance medical services (followed by General Discussion)	

Saturday, 30 September 1995

Space technology in environmental monitoring, telecommunications, disaster preparedness and response

0900-0930	The use of remote sensing for forest	
M. Strome (Canada)		
	damage monitoring and management	
0930-1000	Visible, infrared and synthetic aperture	
P. R. Martini (Brazil)		
	radar data for detecting environmental changes - the Panamazonia Project	
1000-1030	TREES: global tropical forest monitoring using remote sensing data	F. Achard (Commission of the European Communities)
1030-1045	**Break**	
1045-1230	Brief presentations by the participants on the theme of the session	

1230-1400	**Lunch**	
1400-1500	Brief presentations by the participants on the theme of the session	
1500-1530	The role of space technology in developing national assessment of risks from national hazards	M. G. Chandrasekhar (India)
1530-1600	Establishing and implementing disaster preparedness and response policies - the role of space technology	V. U. Ratnayake (Sri Lanka)
1600-1615	**Break**	

Date/Time	***Subject***	***Speaker/Country/ Organization***
1615-1800	Third panel discussion	
	Efficient use of satellite data for environmental monitoring and management of natural disasters - a technological and political challenge (followed by general discussion)	
Sunday, 1 October 1995		
0900-1000	Presentations of chairmen of the technical sessions and general discussion to prepare report	
1000-1030	Summary of the workshop: accomplishments and review of possible follow-up actions	M. Strome (Canada)
1030-1100	Final discussion and adoption of report	
1100-1130	Closing ceremony	
1130-1200	Press conference	