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**DRAFT STRATEGY AND ACTION PLAN ON SPACE TECHNOLOGY APPLICATIONS
FOR SUSTAINABLE DEVELOPMENT IN ASIA AND THE PACIFIC**

(Item 6 of the provisional agenda)

Note by the secretariat

SUMMARY

The draft strategy and action plan on space technology applications for sustainable development in Asia and the Pacific, taking cognizance of the convergence of technologies and capability divide, outlines a framework of regional cooperation among members and associate members of ESCAP to operationally use space-based ICTs in reaching the Millennium Development Goals and the development goals set by major world summits. The Regional Space Applications Programme should follow a thematic-oriented approach with a larger base of stakeholders and evolve networks in prioritized thematic areas, such as disaster reduction, natural resource and environmental management, and major ICT for development fields where satellite-based connectivity may contribute greatly, such as tele-education and tele-health, with poverty alleviation as an overarching strategy. The absence of connectivity and community e-centres should be addressed in underserved islands/regions and remote rural areas. The document recommends actions at the regional and national levels for implementing the programme.

The senior officials are invited to review the draft strategy and action plan, intended for 2008-2013, and discuss concrete actions and mechanisms for implementing the next phase of the Regional Space Applications Programme.

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I. INTRODUCTION

A. Background

1. The Ministerial Conference on Space Applications for Development in Asia and the Pacific was held in Beijing in 1994. Against the backdrop of the United Nations Conference on Environment and Development, or the Earth Summit, held in Rio de Janeiro, Brazil, in 1992 and Agenda 21,¹ efforts were focused on the integration of space technology applications into the overall process of sustainable development. The agenda of the Regional Space Applications Programme for Sustainable Development (RESAP) focused on awareness, networking and human resources development. A three-tiered institutional mechanism, comprising the high-level Intergovernmental Consultative Committee (ICC), four regional working groups on major space applications sectors and education and training networks, was put in place. The Second Ministerial Conference on Space Applications for Sustainable Development in Asia and the Pacific, held in New Delhi in 1999, placed the focus on technical, institutional and policy issues related to the operationalization of space applications in the priority areas of environment and natural resources management, poverty alleviation, natural disaster reduction, food security, capacity-building, human resources development and education, health care and hygiene, and sustainable development planning. RESAP further evolved and established a viable and participatory network.

2. There have been two major global developments, viz. globalization and technology convergence, which have had a considerable impact on economic and social development in the region. In the era of technology convergence, space technology and information and communication technologies (ICTs) became strongly integrated. Broadband connectivity and web-based services became a reality, with breakthroughs such as mobile telephones further fuelling development. Recognizing the potential of such convergence, ESCAP became the first United Nations regional commission to establish an information, communication and space technology (ICST) subprogramme with a divisional unit tasked with assisting the countries of the region in better addressing issues related to the information society by promoting both space technology applications and space-technology-enabled ICTs.

3. Perennial issues confronting the region have been highlighted in the Millennium Development Goals and the outcomes of the World Summit on Sustainable Development,² the World Summit on the Information Society³ and the World Conference on Disaster Reduction.⁴ The relevance

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

² *Plan of Implementation of the World Summit on Sustainable Development (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), chap. I, resolution 2, annex).

³ A/C.2/59/3, annex, and A/60/687.

⁴ A/CONF.206/6 and Corr.1, chap I, resolutions 1 and 2.

and potential of ICT-based products and services are recognized in these global instruments, in particular as regards developing countries.

B. Core issues and challenges

4. The Asian and Pacific region is home to more than 60 per cent of the world's population and about 65 per cent of the world's poor. Poverty alleviation is the focus of economic and social development efforts in the region; it is also the top priority in promoting space technology applications and other space-technology-enabled ICTs. The myriad of poverty issues includes the lack of access to health care and education, voicelessness in the society, degradation of the environment and the natural resources that support the livelihoods of the poor, and vulnerability to natural disasters. In this regard, it is important to recognize the demonstrably catalytic role of space technology applications and space-technology-enabled ICTs in the overall drive towards poverty alleviation and improved quality of life, a significant contribution to which could be made by a well orchestrated programme of telemedicine and tele-education.

5. Another core issue facing the region is its proneness to natural disasters, and global warming could exacerbate the situation. Estimates⁵ show that more than 80 per cent of all natural disasters occur in the region. This was tragically illustrated on 26 December 2004, when the region was hit by one of the worst natural disasters in recorded history, a deadly tsunami spawned by an earthquake in the Indian Ocean. The disaster brought to the fore the importance of information, communication and space technology (ICST) enabled tools for supporting effective disaster reduction practices regarding vulnerability assessment, preparedness, early warning, alert dissemination, disaster mitigation and emergency response. Therefore, immediate priority must go to promoting ICST-enabled knowledge-based disaster management, including the tsunami early warning system for the Indian and Pacific oceans and an alert dissemination network. In the long term, the priority should be on multi-hazard disaster warning, management and emergency communication systems at the national, subregional and regional levels.

6. Regional cooperation must take into account not only the fundamental issues but also the challenges of the large economic and social disparities in the region, the variation in the level of political commitment and the different levels of technological advancement. Effective applications of ICST require capacity and infrastructure, both technological and institutional, and an enabling policy environment. Any regional cooperative mechanism must take account of the existing enabling environments and the overall capacity and interest of the countries of the region.

C. Goal, strategy and framework for action

7. The goal is to assist the members and associate members of ESCAP in effectively harnessing the potential of ICSTs in order to address core developmental issues. The endeavour is to outline a framework for action at the regional and national levels to make operational use of relevant ICSTs in

⁵ See E/ESCAP/SO/MCED(05)/1, para. 41.

support of efforts to achieve the Millennium Development Goals and implement the outcomes of the World Summit on Sustainable Development, the World Summit on the Information Society and the World Conference on Disaster Reduction.

8. To address these goals, the strategy on space technology applications for sustainable development in Asia and the Pacific should reflect the following principles:

- (a) Demand-driven rather than technology-driven applications;
- (b) Harmonization of initiatives and strategies from the regional to local levels;
- (c) Political commitment for the integration of ICST applications with national development planning;
- (d) A flexible and dynamic framework for capacity-building;
- (e) Enhanced regional cooperation and partnership;
- (f) Cooperation with global initiatives and strengthening of the RESAP cooperation network.

The experience with the implementation of the previous phases of RESAP has highlighted the need for a new approach to a regional cooperative mechanism in order to focus on the stated goal while maintaining harmony with technological convergence and the associated reform processes in developing countries of the region.

9. The proposed approach is three-pronged:

- (a) To carry out activities in the areas of disaster reduction, natural resources and environmental management, and major ICT for development fields where satellite-based connectivity may contribute greatly, such as tele-education and tele-health, with poverty alleviation as the overarching strategy;
- (b) To create an enabling environment for the establishment of connectivity and community e-centres, especially in underserved islands and inaccessible rural areas;
- (c) To enhance the base of stakeholders, keeping the community at the core of a multi-stakeholder partnership.

These objectives should form the basis of the framework for action.

II. REGIONAL COOPERATIVE MECHANISM: THE NEED FOR A NEW APPROACH

10. The major issues pertaining to space technology development and its integration with the developmental process remain largely unchanged since the Second Ministerial Conference, but such developments as technological advances in ICST, the emergence of new applications, and the increasing level of private sector participation have added new dimensions.

11. The regional working groups of RESAP are currently defined in terms of technological fields: satellite remote sensing; satellite communications; satellite meteorology; and space science and technology. There are different rates of development in these fields among the countries of the region, however, and it has been recognized that this “capability divide” renders cooperation difficult. For this reason, ICC at its recent sessions has recommended that, under the next phase of RESAP, regional cooperation shift to a thematic focus, taking guidance from internationally agreed development goals.⁶

12. The proposal for a new approach to regional cooperation during the next phase of RESAP is based on the following:

- (a) An assessment of the outcomes of the first and second phases of RESAP;
- (b) The discussions in the sessions of ICC, particularly the round-table discussions held at the tenth session (Bangalore, October 2004) and the eleventh session (Tehran, September 2005) as well as the high-level expert group meeting held with the twelfth session (Daejeon, Republic of Korea, October 2006);
- (c) The meeting of eminent experts held in Bangkok in August 2006;
- (d) The third session of the Committee on Managing Globalization, held in Bangkok in October 2006;
- (e) Consultations with selected participating countries of the region.

Priority areas

13. The thematic priority areas that have been identified are the following:

- Disaster reduction
- Natural resource and environmental management
- Tele-education
- Tele-health.

14. Both Earth observation (EO) and satellite communication (SatCom) play critical roles in disaster reduction. A thematic focus will highlight not only the convergence of EO and SatCom but also space-enabled ICTs. Similarly, EO is critical for natural resource and environmental management and SatCom for tele-education and tele-health. The thematic focus in place of the existing technology-centric regional working groups is expected to yield better results by harnessing the convergence of ICSTs. The next phase of RESAP should also take cognizance of the supportive components of ICSTs (connectivity and community e-centres) and the comparative advantage of these technologies, especially in underserved regions.

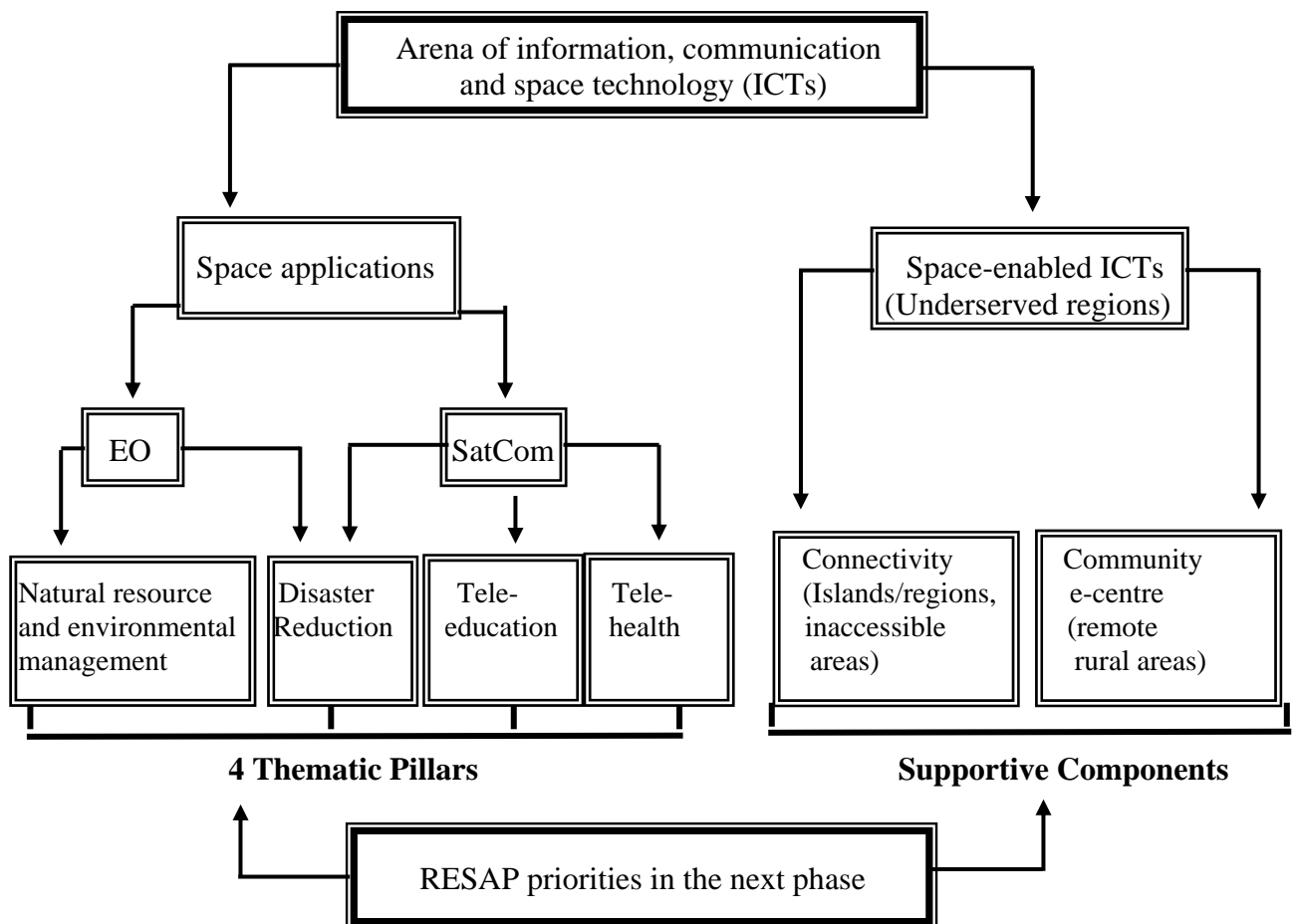
⁶ For a discussion of the related trends, challenges and issues, see E/ESCAP/MCSA(3)/SO/2.

15. With a thematic approach RESAP is expected to become more action-oriented and to be able to bring all stakeholders and resources together. It would promote ICST effectively as an enabler of development, as envisaged in the internationally agreed development goals. It would also enable the international development aid community to understand the catalytic role of such technologies and to integrate them into its aid efforts.

III. STRATEGY FOR A NEW REGIONAL COOPERATIVE MECHANISM AND DIRECTIONAL FOCUS

16. The four thematic priority areas listed in paragraph 13 above will become the pillars of the strategy for a new regional cooperative mechanism. The four thematic pillars will support a spectrum of operationally demonstrated space technology applications. In this regard, an institutional mechanism will need to be created under RESAP in order to foster networking among institutions involved in the development of ICST applications, especially those with poverty alleviation dimensions. The strategy recognizes the supportive components of space-enabled ICTs: connectivity and community e-centres. These would be especially useful in underserved regions, island nations and inaccessible remote and rural areas, where terrestrial infrastructure would not be cost-effective or would take a great deal of time to develop (see figure).

Figure. Proposed strategy for the next phase of the Regional Space Applications Programme for Sustainable Development



A. Thematic networks

17. Four networks emanating from the thematic pillars will reflect the directional focus of RESAP in the next phase. The activities, work programme and networks of stakeholders are to be organized in the respective thematic areas in such a way as to be results-oriented and more focused as well as responsive to the needs of least developed countries, landlocked and island developing countries and countries with economies in transition. The thematic networks will also serve to harmonize cross-sectoral issues under a particular theme and will bring convergence and synergy to initiatives at various levels.

1. Disaster reduction

18. The approach to disaster reduction propounded by ESCAP is based on the fundamental concept of “living with risk” as espoused by the International Strategy on Disaster Reduction.⁷ Key elements include strategic planning (political will and participation of all stakeholders; knowledge management), community-based disaster risk management, following good practices (including those based on space technology applications), promotion of subregional networking and mechanisms, and public-private partnerships for disaster reduction. In the Regional Action Plan towards the Information Society for Asia and the Pacific,⁸ knowledge-based disaster management is recognized as an important field for bridging the digital divide. The Beijing Action for Disaster Risk Reduction in Asia⁹ contains a recommendation to explore the possibility of establishing regional/subregional technical supporting capacities and facilities to help build the resilience of nations and communities.

19. Space agencies worldwide have been emphasizing disaster management support activities as a basis for regional and international cooperation. It has been recognized that no single space agency is in a position to respond efficiently to natural disasters on a global scale and that collective efforts within the framework of international cooperation hold the key. Providing free, understandable and rapid remote-sensing-based products for civil defence/disaster management agencies in response to emergencies is a typical approach, and many space agencies have agreed to participate in the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters, which systematizes that approach. The Global Earth Observation System of Systems (GEOSS) is now in place with a 10-year implementation plan wherein disaster reduction has been accorded the highest priority. In fact, GEOSS signals a major departure of focus from technology to applications and services. The United Nations Platform for Space-based Information for Disaster Management and Emergency Response (SPIDER)¹⁰ is another initiative aimed at securing

⁷ See *Living With Risk: A Global Review of Disaster Reduction Initiatives*, 2004 (United Nations publication, Sales No. GV.E.03.0.2 (two-volume set)).

⁸ United Nations publication, Sales No. E.06.II.F.20.

⁹ Adopted on 29 September 2005 by the Asian Conference on Disaster Reduction, held in Beijing.

¹⁰ See General Assembly resolution 61/110 of 14 December 2006.

access to EO products in order to cover all phases of disaster management. Within the region, the Sentinel Asia project promoted by the Asia-Pacific Regional Space Agency Forum (APRSAF) is an important initiative that is likely to integrate value added space information products and services from EO satellites and communication satellite capability into a regional disaster reduction support system. A dedicated constellation of EO satellites for disaster management is under development by China, which will launch the first three satellites in 2008. It is expected that the full deployment of the constellation will be achieved through international cooperation. The proposed endeavour would involve integrating these initiatives with RESAP more closely, especially to support least developed countries, island and landlocked developing countries and countries with economies in transition.

20. Because of their ability to provide rapid broadband communication, satellites can form the backbone of a communication system during an emergency. Satellite broadband communication has therefore been recognized as one of the most needed means of supporting disaster response. IP-based platforms support voice/data/video communication requirements, and a network of relevant nodes within a disaster management system would ensure the flow of information, including that derived from Earth observation satellites. However, as many smaller economies still cannot afford to have their own space systems, there is still a need to explore all feasible approaches to finding an affordable way to share space resources at the subregional level.

21. The success of the Typhoon Committee and the Panel on Tropical Cyclones, both established by ESCAP in cooperation with the World Meteorological Organization (WMO), demonstrates that a framework at the regional/subregional level affords opportunities for greater integration of stakeholders in the overall process of disaster reduction and can lead to deeper institutional networking. Such a framework could be expanded to space information service mechanisms with the aim of supporting the effective management of future disasters in the region.

22. RESAP II has made considerable progress towards integrating space information products and services into disaster reduction strategies in the region. It has also laid the foundation for a regional cooperative framework with multiple stakeholders. The Meeting of Experts on Space Applications for Disaster Management, held in Chiang Mai, Thailand, from 25 to 28 July 2005, proposed a framework to address regional/subregional end-user needs collectively and integrate space information products and services into hazard zonation and risk assessment, early warning and damage assessment, among others. The proposed thematic network on disaster reduction would capitalize on these initiatives; work on networking the contemporary initiatives with RESAP; and assist countries with small economies in their efforts towards disaster risk reduction.

2. Natural resource and environmental management

23. Preventing environmental degradation, reducing poverty and enriching the natural resource base by harmonizing economic development with environmental ethics and social ethos form the core

of sustainable development. The Johannesburg Plan of Implementation² spelled out the roles of Governments and institutions, non-governmental organizations and stakeholders in the sustainable development processes and made a number of recommendations on the conservation and management of resources.

24. The role of EO systems and GIS in providing inputs for breaking the nexus between poverty and environmental degradation has been recognized. RESAP II has been instrumental in showcasing some of the best practices involving EO applications in natural resource and environmental management and in the sharing of information and expertise through various capacity-building efforts. Furthermore, RESAP II has been effective in networking stakeholders in the region. The thematic network would strengthen the networks of stakeholders and the regional cooperative mechanism to support natural resource and environmental management as identified in the internationally agreed development goals.

3. *Tele-education*

25. With the emergence of the knowledge era, the focus on skills and knowledge is important not only for faster growth but also for poverty alleviation. Achieving universal primary education is one of the Millennium Development Goals. From the early days of satellite communications, tele-education services to rural and remote areas have attracted the attention of government authorities and civil society. Tele-education services now cover university and teachers' training and directly support educational activities in primary and secondary schools. The Asian and Pacific region has been at the forefront of distance education through the use of communication satellites. However, many least developed countries and Pacific island countries in the region still have an unfulfilled need for distance education and for localization of suitable services.

26. In recent years, high-power broadband communication satellites have proliferated and many tele-education projects have been launched. One significant development is the recent launching by India of a dedicated satellite for education. The advent of Ku-band satellites has made small, low-cost user terminals possible and has spurred the expansion of multimedia satellite networks. Such advances will further enable users to exchange real-time applications, revolutionizing interactive communication.

27. There have been many initiatives around the world for ensuring interoperability between various systems and appropriate development of standards. Further advances are forthcoming, such as the satellite-based Internet system, which, with its higher handling capacity, would compete with terrestrial systems of similar capability and could be particularly attractive for remote island nations and unconnected territories. The thematic network on tele-education would focus on these technological, operational and policy issues and would assist least developed countries in making the formal and informal education sectors more effective.

4. *Tele-health*

28. Three of the Millennium Development Goals are health-related: reducing child mortality; improving maternal health; and combating HIV/AIDS, malaria and other diseases. Of all the divides confronting the region, the health divide is the widest, not only among countries but also between rural and urban centres within countries.

29. Space-enabled ICT telemedicine services, such as clinical messaging (advice, results and referrals), distribution of electronic health records, increased connectivity between health service centres, and monitoring of remote and home-based patients, would be improved and extended to communities in need of them. Training health workers is another major tele-health field. Community e-centres may greatly assist health workers, particularly family planning workers, in providing health services and educating people in health-related issues at the community level. Since the outbreak of severe acute respiratory syndrome and current preparations with regard to avian influenza, geoinformatics has been recognized by the World Health Organization, the Food and Agriculture Organization of the United Nations (FAO) and many countries as a powerful tool for supporting effective preparedness and controlling a possible pandemic. At the policy level, challenges include instituting professional standards for the provision of care and the licensing of caregivers, regulating medical devices and the various software applications; and attaining a degree of subsidization, on the grounds of public good, for satellite connectivity. The thematic network on tele-health would address these issues and would advocate for least developed countries, island developing and landlocked countries, and countries with economies in transition. In particular, the network would strive to raise awareness and make tele-health services an integral part of the overall health-care operational environment.

B. Supportive components of ICST

1. *Space-based connectivity in underserved areas*

30. Regional cooperation in satellite-based connectivity and relevant ICT applications will connect the underserved countries/subregions in a significant manner. An effective modality is needed in order to meet increased infrastructure requirements in ICST. The private sector plays a dominant role in this field, but commercial considerations make private companies hesitant to invest in infrastructure for rural and low-density areas. Space-enabled ICT connectivity then becomes one of the priority areas for underserved remote and rural areas and for Pacific island developing countries. The next phase of RESAP should contribute to the search for ways, including relevant follow-up, to help these countries become connected through satellite communication with the outside world.

2. *ICST-based community e-centres in underserved areas/regions*

31. Multiple-purpose community-based information centres, or e-centres, provide a platform for resource-sharing and thus facilitate numerous information-based services and applications in rural and less developed areas. Examples of such services and applications include electronic banking, market

information and supply-chain nodes for rural commerce, as well as health, education and governance information services. Often, such centres are located in rural and remote areas where terrestrial connectivity is usually not available. Space technology can play an important role in the development/operation of e-centres and, through them, provide communities with ICT services and applications. Some pilot cases have demonstrated that, when appropriately organized, income from such services can help recoup the system cost within a few years.

32. Satellites will play an important role in providing community e-centres with broadband connectivity and bringing various needed e-services to the poor, provided suitable satellite coverage exists. Although there are many satellite service providers in Asia, the question of artificially high licensing costs and other regulatory charges in some jurisdictions should be addressed to avoid negating this advantage.

33. Connection cost is a major factor in the sustainability of a community e-centre. A regional cooperative arrangement of some kind could help to lower such costs. The other challenge to sustainability is the availability and affordability of relevant services and applications. Through regional cooperation, relevant government organs will be able to better understand the technical possibilities, the connectivity and content resources that could be shared, and formulate relevant policies and make institutional arrangements to provide development-oriented services and applications through community e-centres.

34. The activities under the thematic networks and the supportive components will be formulated in such a way as to contribute to poverty alleviation in conformity with internationally agreed development goals. The regional cooperative mechanism will continue to drive this strategy by connecting the thematic networks more effectively and by fostering synergy among national, regional and international initiatives.

IV. MEANS TO SUPPORT IMPLEMENTATION

A. Capacity-building

1. The World Summit on the Information Society and GEOSS

35. Capacity-building encompasses not only education and training (building technical skills, potential values) but also organizational and institutional strengthening. The Plan of Action adopted by the World Summit on the Information Society¹¹ emphasizes capacity-building as the route to build competence in ICT, acquire appropriate skills to benefit fully from the information society and use ICT to achieve universal education and to enable lifelong learning. In this context, capacity-building includes not only technical expertise but also the means to implement policies and establish an appropriate regulatory environment and manage complex processes as well as managing ICT-enabled enterprises effectively. GEOSS capacity-building efforts in training and institutional networking,

¹¹ A/C.2/59/3, annex, chap. I, sect. B.

which are directly related to ICST-based products and services, provide another opportunity to better utilize space information products and services. Synergizing these initiatives with RESAP would especially benefit the least developed countries of the region.

2. RESAP training and education networks

36. RESAP has an established and effective training network comprising regional training institutions in China, India and Indonesia. These networks have made valuable contributions towards capacity-building and would play an even greater role in the future. Institutions with sharply focused and relevant mandates have recently been established, such as the Asian and Pacific Training Centre for Information and Communication Technology for Development, located in Incheon, Republic of Korea. In addition, there are national initiatives. To address the lack of skilled human resources in space applications to deal with disasters specific to the subregion, the Islamic Republic of Iran plans to set up a centre for disaster management using space technology and ICTs.

3. Advocacy, dialogue and policy advice

37. Space technology itself is not a solution to all of the region's development needs; there are other factors to consider: policy, development financing, thematic and subregional organizations and cultural context as well as national, provincial and community perspectives. Expert group meetings and specialized workshops on contemporary issues would provide useful policy advisories for members and associate members of the Commission.

38. In its next phase, RESAP would work closely with cognate bodies and seek to gain maximum synergy from partnerships. Organizations that may be involved include but are not limited to: APRSAF; Asia-Pacific Satellite Communication Council (APSCC); Asia-Pacific Space Cooperation Organization (APSCO); Group on Earth Observations (GEO); Association of Southeast Asian Nations (ASEAN); ASEAN+3; South Asian Association for Regional Cooperation (SAARC); Central Asia Regional Economic Cooperation (CAREC); Pacific Islands Forum; Asia Cooperation Dialogue (ACD); Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC); Brunei Darussalam Indonesia Malaysia Philippines - East ASEAN Growth Area (BIMP-EAGA); and many United Nations agencies, such as FAO, the International Telecommunication Union (ITU), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and WMO.

B. Building public-private partnerships

39. As space applications and space-enabled ICTs are moving away from governmental control, it is necessary to engage the private sector and the community itself. In the Tunis Agenda for the Information Society,¹² adopted in November 2005, the World Summit on the Information Society

¹² A/60/687, annex, chap. I, sect. B.

agreed that public-private partnerships were needed to achieve the goal of an “information society for all”. In that regard, multi-stakeholder partnerships are necessary in order to share responsibility and find innovative means to pool resources and talents based on the core strengths of the partners. The arrangement is designed so that all collaborating partners can derive benefits.

40. It is envisaged that, in its next phase, RESAP will foster the following:

(a) The development of public-private partnerships on specific issues by creating a mechanism designed to involve the private sector and groups of countries with common problems and a critical mass of demand for applications;

(b) The development of public-private-community partnerships by involving end users to ensure that practicable products and services reach communities;

(c) Coordination among many stakeholders by bringing the interests of the private sector and the community into the discussions.

Multi-stakeholder partnerships at the country level would be important components of the thematic networks.

C. Mobilizing financial resources

41. Financial arrangements and resource mobilization have presented one of the major constraints to the full implementation of RESAP. Financial constraints have, to a certain extent, impeded (a) the organization of specific technical cooperation projects, (b) capacity-building and group training activities, and (c) the full utilization of the capabilities of existing regional institutions. As the next phase of RESAP is likely to face more complex issues and therefore to be more ambitious, the issue of financial resource mobilization needs to be addressed as an integral part of any implementation activity.

42. The outcome documents of the major global summits contain suggestions for specific means of obtaining necessary funding support for the implementation of activities. Some of the opportunities that need to be appropriately tapped are the following:

(a) Some space agencies and initiatives have expressed an interest in supporting RESAP in capacity-building and the development of cooperation mechanisms for the effective use of space technology to address major global concerns, particularly in disaster management;

(b) The Digital Solidarity Agenda¹³ of the World Summit on the Information Society identifies a range of possibilities for financing, including the mainstreaming of ICST activities into official development assistance strategies; developed donor countries; and international agencies. Similar opportunities offered by other global instruments need to be fully harnessed;

¹³ See A/C.2/59/3, annex, chap. I, sect. B, para. 27.

(c) Initiatives under the UNDP cooperation framework for South-South cooperation¹⁴ specifically fund activities promoting closer technical and economic cooperation among developing countries by employing experts from those countries to share best practices, knowledge and expertise. Additional support is provided by donors/international organizations through triangular cooperation arrangements;

(d) The traditional donors of ESCAP could support RESAP activities, including policy and generic studies within the context of the work programme of ESCAP and capacity-building through training and education networks;

(e) International and regional financing institutions could support the implementation of RESAP thematic activities in areas of common interest;

(f) Countries in the region could fund the thematic network of activities themselves, with official development assistance providing supplemental support. This would be in conformity with the Monterrey Consensus,¹⁵ in which developing countries accepted responsibility for their own development, but which stressed the critical importance of support from developed countries;

(g) The principal investor in ICST infrastructure development is expected to be the private sector. In order for the private sector to roll out services in remote rural areas, Governments need to create an enabling environment. In this regard, RESAP should promote public-private partnerships by introducing an agenda that brings the interests of the private sector and other stakeholders into the discussions in a focused manner.

D. Integrating user needs and gender dimensions

43. Satellite technology has emerged as a potentially efficient and cost-effective way to bring ICTs to rural and remote areas and provide ICT access where terrestrial infrastructure is not feasible. It could also provide crucial services in situations where conventional social service delivery systems cannot function. In this connection, it would be important to ensure that the impact on women and socially vulnerable groups is considered and to address their needs in the design of ICST applications. Their participation and feedback could ensure the effectiveness of these efforts.

E. Devising a policy framework

44. In an environment of technological convergence, the challenge that decision makers face lies in devising a policy framework that is technology-neutral and flexible enough to be able to adapt to a fast-changing reality. Making this possible requires that experts, both technologists and policymakers, be brought together to exchange viewpoints and perhaps showcase their expertise. It would be prudent, in this regard, to establish coordinated policy and relevant research capacities in the region.

¹⁴ See DP/CF/SSC/3/Rev.1.

¹⁵ *Report of the International Conference on Financing for Development, Monterrey, Mexico, 18-22 March 2002* (United Nations publication, Sales No. E.02.II.A.7), chap. I, resolution 1, annex.

V. ACTION PLAN

A. Strengthening institutional mechanisms

45. Networking has been the most visible strength of RESAP. For this reason, networking should be enhanced by enlarging the base of stakeholders around a common theme, thus expanding the reach of RESAP. To this end, the following actions are proposed:

(a) Regional level:

- (i) The focus of the regional working groups should be changed from a technology-centric to a thematic orientation in conformity with the thematic pillars, resulting in a network of networks. The regional working groups of RESAP should be reorganized as follows:
 - Regional working group on ICST applications for disaster reduction
 - Regional working group on ICST applications for natural resource and environmental management
 - Regional working group on ICST applications for tele-education
 - Regional working group on ICST applications for tele-health
- (ii) Technical cooperative projects should be formulated in cooperation with relevant stakeholders in order to find ways to bring broadband connectivity and community e-centres, the supportive components of ICST, to underserved regions/countries;
- (iii) The ESCAP secretariat should be retained as the secretariat of the enhanced RESAP;
- (iv) ICC should be retained to oversee RESAP and should invite the participation of the private sector, space and ICT agencies, regional and professional bodies and development finance institutions in the formulation of specific development projects;
- (v) The ESCAP secretariat should encourage countries, donors and other entities to fund and support the work programme and technical cooperation projects;
- (vi) The secretariat should place emphasis on activities designed to assist least developed countries, landlocked developing countries and Pacific island countries and should, at the request of any of those countries, procure expert advice on space applications for development;

- (b) National level:
 - (i) Participating members and associate members should strengthen coordination among national stakeholders and encourage the creation of a nodal agency for coordinating and organizing thematic networks within a country;
 - (ii) Funding should be arranged for national contact and focal points to perform their functions, which would include attending meetings of the regional working groups and ICC respectively;
 - (iii) Participating members and associate members should strive to make cash and/or in-kind contributions towards the implementation of activities under the next phase of RESAP, for example by providing experts or consultants or other forms of support. Pledges could be made at the annual sessions of ICC or the Commission.

B. Increasing resilience to disasters by using appropriate ICST applications

46. There is a need for a paradigm shift in disaster reduction from crisis management to risk reduction, with a multiple hazards integrated approach. The focus should be on: a participatory approach (from planning for the community to planning with the community); putting the community first (from top-down prescriptions to local level planning); enhancing community coping mechanisms and resilience; and transitioning to a new policy regime (from the regulatory apparatus as the primary vehicle to multiple interventions, including ecological, financial (risk transfer) and technological. The following actions are proposed:

- (a) Regional level:
 - (i) The secretariat should organize, with participating members and associate members, expert group meetings to establish regional disaster reduction information networks, to identify fields of common interest and to share methodologies and relevant resources for strengthening national risk and impact assessment capabilities;
 - (ii) The secretariat should, in concert with participating members and associate members, develop a regional cooperative mechanism on space information for drought disaster reduction, initially at the subregional level, to be extended in accordance with the requirements of members;
 - (iii) In conjunction with ISDR, FAO, WMO, UNESCO/IOC, ADRC, ADPC and other relevant organizations, the secretariat should take the necessary steps to enable members and associate members to derive benefits from a multi-

hazard and durable early warning system, including the capability to warn of tsunamis in the Indian Ocean;

- (iv) The Sentinel Asia project should be promoted in cooperation with APRSAF to contribute Earth observation information and satellite communication capabilities for disaster response and planning with a view to establishing a disaster management support system in the region;
- (v) A study on the feasibility of establishing a forum of Earth Observation satellite operators should be conducted with a view to assisting developing countries, especially least developed countries, in disaster management support;
- (vi) Work with cognate entities should be carried out in order to create a robust regional emergency (disaster management) communications system, as envisaged in the Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations of 18 June 1998, which entered into force on 8 January 2005,¹⁶ and to access EO products/services through the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters, GEOSS, Sentinel Asia and the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (SPIDER);¹⁰
- (vii) Suitable space-based products and services for disaster management support should be promoted, including hazard zoning/risk assessment, early warning, emergency communications and impact mapping/damage assessment as well as local “value adding” information organizations;
- (viii) The exchange of best practices on the use of e-centres as community disaster reduction hubs should be promoted, as recommended in the Hyogo Framework for Action;¹⁷
- (ix) Systematize and promote data policies and agreements that would improve and ensure access, timeliness and affordability of data and data products that are useful for disaster planning and response;
- (x) Promote mutual understanding and dialogue between disaster management authorities and space agencies;

¹⁶ United Nations, *Treaty Series*, vol. 2296, No. 40906.

¹⁷ A/CONF.206/6 and Corr.1, chap I, resolution 2.

- (b) National level:
 - (i) Participating members and associate members should commit to the regional initiatives cited above;
 - (ii) Disaster management agencies should integrate practicable space-enabled products and services on an operational basis and promote community awareness and participation in risk reduction measures and responses to emergencies;
 - (iii) Space agencies, research organizations, communication service providers and GIS industry members should commit to supporting rapid response services and products in support of disaster management requirements;
 - (iv) Governments should harmonize efforts in risk management, both internally and externally, in order to avoid gaps and incompatibilities between local, national and international early warning systems; national and local policies and practices for a holistic approach to risk mitigation should be implemented where they are not already in place.

C. Using space applications to support natural resource and environmental management

47. The Johannesburg Plan of Implementation² focuses on the ecosystem approach and emphasizes the direct involvement of stakeholders in recognition of the fact that communities are the custodians of natural resource management; governments and institutions play the enabling and facilitating roles in all the processes of natural resource and environmental management. The valuable experience with this approach that has been gained through phases I and II of RESAP should form a sound basis for further work in the next phase of RESAP, especially in relation to supporting least developed countries. The following actions are recommended in order to address natural resource and environmental management effectively:

- (a) Regional level:
 - (i) The secretariat should establish, in concert with participating members and associate members, a thematic network on natural resource and environmental management comprising experts in relevant areas, including remote sensing and GIS, with poverty alleviation as its objective;
 - (ii) EO applications should be promoted in the implementation of international protocols and conventions, with a focus on operational methodologies and relevant products and services and in support of “green growth” activities in the region;

- (iii) Information on best regional practices and benchmarks should be disseminated and the adoption of best practices should be facilitated;
- (b) National level:
 - (i) Participating members and associate members should commit to the thematic network described above;
 - (ii) Participating agencies should integrate and operationalize the use of EO products and services in national policy, targeted interventions and implementation of developmental strategies in the area of natural resource and environmental management;
 - (iii) EO applications should be promoted in the priority areas identified by the World Summit on Sustainable Development, the green growth agenda, natural resource and environmental accounting, a participatory approach towards land and water resource management, and agricultural statistics;
 - (iv) EO applications should be promoted in the implementation of national regulations for environmental protection, such as afforestation programmes and coastal zone management, and they should be used as tools for compliance with international protocols and conventions;
 - (v) EO applications should be promoted for disaggregated poverty mapping.

D. Using ICST to support distance education

48. With many initiatives around the world making use of satellite-based distance education systems, including broadband Internet systems that complement terrestrial systems, there is a need to foster interoperability between various systems and develop appropriate standards. There is also a need to build the capacity of developing members to adopt cost-efficient satellite-enabled technical solutions, develop and share courseware resources and formulate supportive policies and cooperative mechanisms for sharing relevant space and terrestrial resources. The following actions are recommended in order to make effective use of space-based ICTs to support extending the reach of tele-education to remote rural areas:

- (a) Regional level:
 - (i) The secretariat should organize, in concert with participating members and associate members, a thematic network on space-based distance education comprising experts in all relevant areas;
 - (ii) The rationalization of communication networks and the sharing of infrastructure should be promoted;

- (iii) The network should promote the development and sharing of curricula and the sharing of experiences and training opportunities for teachers, curriculum developers and line departments;
 - (iv) The network should also promote the creation and localization of content with periodic updating and content designed for the rural populace to develop skills through e-centres;
- (b) National level:
- (i) Participating members and associate members should commit to the thematic network described above and consider integrating satellite-enabled tele-education, when appropriate, as a strategy for human resource development;
 - (ii) Participating organizations should share the network's facilities, resources and knowledge;
 - (iii) Women should have access to tele-education facilities where attendance at formal education facilities is not feasible;
 - (iv) The implementation of distance education programmes should be assessed in order to consider language and cultural balances and the degree of content localization, and to protect against displacing teachers or diluting their traditional role and status.

E. Using ICST to support e-health initiatives

49. The operationalization of telemedicine and e-health services requires technical knowledge, economic viability, organizational support and behaviour modifications. Telemedicine and e-health services must be interoperable on four levels of connectivity: political (policy, ethical and legal aspects); social (professional and citizen mobility, citizen-centred approach); organizational (health system and service integration and coordination among individuals and the community; appropriate regulations and agreements); and technical (communication networks, content standards, platform standards). The following actions are recommended in order to support an e-health network that functions in a cross-border fashion:

- (a) Regional level:
- (i) The secretariat should organize, in concert with participating members and associate members, a thematic network on e-health comprising experts in all relevant areas, and promote an expanded telemedicine network in the region;
 - (ii) Promote the rationalization of communication networks and the sharing of infrastructure, including space satellite capacity, and the rationalization of the regulatory, financial and policy environments;

- (iii) The network should promote the establishment of a repository of regulatory, financial and policy information as well as information on the availability of “super-speciality” hospitals and services;
 - (iv) Promote the exchange of information on good practices and guidelines for administering e-health facilities;
 - (v) Assist in capacity-building and the adoption of satellite-based e-health and e-learning tools for the training of health-care and family planning workers at the community level through community e-centres;
- (b) National level:
- (i) Participating members and associate members should commit to the thematic network described above and should consider incorporating tele-health into their national health-care policy;
 - (ii) Participating organizations should establish operational telemedicine/tele-health care facilities and control centres;
 - (iii) Government authorities should develop appropriate regulatory, financial and policy environments.

F. Bringing digital connectivity and community e-centres to underserved regions

50. Recognizing the cost-effectiveness of SatCom-based services in underserved regions/countries, the World Summit on the Information Society highlighted expanding their outreach to improve connectivity and, through community e-centres, empower people by providing them with access to a variety of services. Providing scalable enterprise connectivity among companies and governmental institutions through such interventions will go a long way towards bringing rural, remote, isolated and underserved regions into the mainstream of development. The following actions are proposed:

- (a) Regional level:
- (i) The secretariat should work with participating members and associate members and other relevant organizations to promote an appropriate cooperative mechanism designed to support sustainable satellite-based connectivity and community e-centre initiatives;
 - (ii) The network should support, through relevant space technologies, the current ESCAP/ADB project to establish a network of community e-centres designed to combat poverty, create economic opportunities, provide access to all kinds of services, including e-governance and disaster warnings and generate related employment;

- (iii) Promote public-private partnerships and community participation in this field along with sustainable policies and business models for community e-centres; share best practices and highlight role models in making available communication infrastructure to support rural economic development;
 - (iv) With a view to making the cost of Internet access widely affordable, promote the leasing of bandwidth by satellite operators, particularly for areas and small island countries in the Pacific are not connected by global fiber-optic cable;
 - (v) In the light of the specific difficulties of Pacific island developing countries and in the context of the follow-up to the Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States,¹⁸ the possibility of establishing a dedicated satellite communication infrastructure should be studied in cooperation with the Pacific Islands Forum Secretariat and other United Nations bodies and relevant international organizations, investigating policy, financial sustainability, management and technical aspects;
- (b) National level:
- (i) Participating members and associate members should commit to the thematic network described above and should review their policy, regulatory and licensing regimes to facilitate satellite connectivity;
 - (ii) National policies should be reassessed in order to protect against abuses of information technology (pornography, money laundering, incitement of hatred, loss of cultural identity) and interruptions of service;
 - (iii) Develop policies of “e-inclusiveness” to bring advantages of ICST within the grasp of marginalized and disadvantaged groups;
 - (iv) Licensing, spectrum allocation, monopoly-granting and other policies and regulations should be assessed with a view to removing impediments to service expansion and reducing costs for end-users;
 - (v) Policies to facilitate e-commerce should be implemented.

G. Building the capacity to utilize ICST applications for development

51. Capacity-building encompasses human, scientific, technological, organizational and institutional resources and capabilities. In summary, the overall objective of ICST capacity-building is

¹⁸ *Report of the International Meeting to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States, Port Louis, Mauritius, 10-14 January 2005* (United Nations publication, Sales No. E.05.II.A.4 and corrigendum), chap. I, resolution 1, annex II.

to create an innovative human resource base, taking into account three interrelated activities: human resource development; organizational management strengthening; and institutional strengthening and networking. The following actions are proposed:

(a) Regional level:

- (i) RESAP should continue to enable specialized training and education and the sharing of best practices in applications, operations, policy development, including deregulation, competition and meeting community service obligations in communications, generating income flow to make space-enabled enterprises sustainable and targeting support at least developed countries, landlocked developing countries and Pacific island countries;
- (ii) RESAP should continue to synergize by coordinating and collaborating with United Nations agencies that have programmes in the countries of the region (for example, FAO/FIVIMS for drought monitoring; ITU for emergency communications; the Office for Outer Space Affairs, UNESCO/IOC, WMO and others for multi-hazard management);
- (iii) Links with kindred regional institutions should be strengthened to the maximum extent through cross-participation and delegation of tasks;
- (iv) Work with specialized regional institutions:
 - Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT) for human resource development in ICT
 - Asian and Pacific Centre for Transfer of Technology (APCTT) for research and transfer of technologies, including advanced ones
 - Centre for Space Science and Technology Education in Asia and the Pacific (CSSTE-AP) and established training institutions in China and Indonesia for curriculum development, education and training
 - APSCO, APRSAF, APSCC, ASEAN, BIMSTEC, SAARC, AIT and other relevant institutions to promote long-term regional space applications for development

(b) National level:

- (i) Participating members and associate members should consider supporting capacity-building activities and the creation of a cadre of professionals in the ICST domain;

- (ii) Institutional infrastructure and networking among ICST institutions should be strengthened for the benefit of users, community-based organizations, non-governmental organizations and private agencies;
- (iii) The private sector and academia should be involved in capacity-building initiatives.

H. Engaging the private sector and building partnerships

52. Strategic alliances between government, business and civil society are increasingly frequent in many countries. Millennium Development Goal 8 calls for the development of a global partnership for development. The Tunis Agenda for the Information Society¹² stresses the need for a multi-stakeholder approach. As most communication services are provided on a commercial basis while most development-oriented ICT services and applications are supported by governments, public-private partnerships play an extremely important role in ensuring affordability and viability, in particular for access by least developed countries to relevant resources and services of a cross-boundary nature. The following actions are proposed:

(a) Regional level:

Involve the private sector to:

- Make space operations and communication services affordable and sustainable in the long term through public-private partnerships and other suitable commercial models
- Review the cost of leasing Internet bandwidth from satellite operators, particularly for least developed countries and Pacific island countries, for which a connection to fibre-optic backbones is not economically feasible
- Define and deliver training and education needs
- Sponsor scholarships and education prizes at universities and training centres in the region
- Nurture professional societies

(b) National level:

- (i) Members and associate members should consider policies that encourage private sector participation in radio and television broadcasting, particularly to cover remote, underserved, mountainous or island areas, and for the delivery of public goods, such as education and health programmes;
- (ii) Enable universal service obligations in rural areas.

VI. TIME FRAME

53. The draft strategy and action plan are intended to be applied in the period from 2008 to 2013, with modification to the extent necessary in response to reviews carried out by the Commission. A fourth ministerial conference may be convened at an appropriate time, to be determined by emerging conditions and the interests and circumstances of the members of the Commission.

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