FOR PARTICIPANTS ONLY

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Implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III)

Final Report of the Action Team on Capacity Building

The present document contains the final report submitted by the Action Team on Capacity Building (recommendation no. 17 of UNISPACE III) for consideration by the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space at its forty-first session. The final report will be issued in all languages of the United Nations as document A/AC.105/L.251 prior to the forty-seventh session of the Committee, to be held in Vienna from 2 to 11 June 2004.

* Revised for technical reasons.

Final report of the Action Team on Capacity Building

I. Introduction

A. Background

1. To enhance the peaceful uses of outer space, it is necessary to promote appropriate education and training to enhance national and institutional capacities around the world in order to facilitate access to the benefits of the applications of space technologies. Towards this purpose the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), in its resolution[1], recommended that capacity building should be enhanced through the:

a) development of human and budgetary resources;

b) training and professional development of teachers;

c) exchange of teaching methods, materials and experience; and

d) development of infrastructure and public policy.

2. The present report highlights a number of current activities and existing infrastructure related to capacity building in space-related fields and concludes with a set of recommendations, and proposes a concrete action plan to effectively enhance capacity building.

B. Mandate and expected products of the Action Team on capacity- building

3. At its forty-fourth session, held in Vienna in June 2001, the Committee on the Peaceful Uses of Outer Space (COPUOS) mandated that its member States and organizations with permanent observer status with the Committee coordinate, under the leadership of Japan, the implementation of Recommendation 17 of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), to enhance capacity building through the processes outlined above.

4. In order to realize these objectives, member States and organizations of this Action Team agreed to carry out the following activities:

(a) to share information on existing fellowships for scientists, engineers and technicians, and to determine how to enhance education and training opportunities;

(b) to organize and develop mechanisms for the exchange of capacity building information, including established teaching methods, training materials and lessons learnt.

C. Membership of the Action Team

5. The membership of the Action Team consists of the following member States and organizations:

1. Member States: Argentina, Azerbaijan, Bolivia, Brazil, Canada, Colombia, Ecuador, Egypt, France, Hungary, India, Iran (Islamic Republic of), Japan

[1] "The Space Millennium: Vienna Declaration on Space and Human Development"

(Chair), Kazakhstan, Lebanon, Mexico, Morocco, Nigeria, Pakistan, Peru, the Philippines, Portugal, Saudi Arabia, Syrian Arab Republic and United States of America;

2. Member Organizations: Committee on Space Research (COSPAR), European Space Agency (ESA), United Nations Economic and Social Commission for Asia and the Pacific (UN/ESCAP), International Astronomical Union (IAU), Manila Observatory, Space Generation Advisory Council (SGAC), United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Office of Outer Space Affairs (UNOOSA) (???), the Committee on Earth Observation Satellites (CEOS), International Astronautical Federation (IAF), and National Space Society (NSS).

D. Summary of activities of the Action Team

6. The Action Team convened nine coordination meetings between March 2002 and September 2003 and one Forum on capacity building. The Forum included presentations on a broad range of national and international activities and was held in October 2002 in Houston, Texas, USA. More than 50 participants from 17 countries and 7 organizations attended the forum in Houston. The level of participation in the coordination meetings was similarly high. To facilitate the participation of members of the Action Team, eight of its meetings were held in Vienna on the margins of the sessions of the Committee for the Peaceful Uses of Outer Space or meetings of its Scientific and Technical Subcommittee. The last meeting of the Action Team was held in Bremen, Germany, on the margins of the International Astronautical Congress.

1. Coordination meetings

7. The coordination meetings served for the Action Team members to exchange information and views relating to capacity building in order to establish, or strengthen, common understandings of terminology and to better understand the importance of capacity building in deriving economic and social benefits from space applications and thereby enhancing the peaceful uses of outer space. Thus, the coordination meetings acted as platforms for regular exchanges of ideas and information, which was one of the goals of the Action Team.

2. Forum for capacity building (15 October 2002, Houston, Texas, USA)

8. As agreed to by the members of the Action Team, a "Forum on capacity building" was held in conjunction with the "World Space Congress" in Houston, Texas, USA, on 15 October 2002. The purpose of this forum was to exchange information on teaching methods, materials and experiences of experts and organizations in regards to space-related education and capacity building activities. All the presentations made at this forum can be viewed on-line at the website of the Office for Outer Space Affairs (http://www.oosa.unvienna.org/unisp-3/followup/action_team_17/houston2002/index.html). Additional background information on the activities of Action Team 17 can be found at the following website: http://www.bonnoffice2002.org/UN/.

3. Rationale of "Capacity building"

9. As a result of the activities and meetings outlined above, the Action Team members reached a consensus on a concept of capacity building, its importance, and agreed on the following approach:

(a) On an international level, space-related education and training opportunities for all age categories (from children to experts) and in all disciplines should be increased or strengthened. These opportunities develop the capabilities to utilize space assets for societal benefits and strengthen effective and peaceful uses of outer space.

(b) The practical use of space science and technology by developing countries particularly should be emphasized and encouraged through an effective enhancement of capacity building on a global scale.

II. Capacity building activities of Action Team Members, including contributions from countries that are not members of the Action Team

A. Capacity building activities by countries

10. Ten countries completed the questionnaire circulated by the Action Team to all member States. The results received are summarized below (Please see Annex I for more detail).

1. Azerbaijan

11. The activities of the Azerbaijan National Aerospace Agency (ANASA) are related to the development of theoretical principles, design of pilot projects, development of systems for collecting, processing, distributing and using remote sensing data for natural resources research, land use, environmental monitoring and disaster management.

12. ANASA runs a large programme on space and remote sensing education at a professional level. Many specialists of ANASA have been educated at key universities within Russia and have worked in renown space programmes/projects of the former Union of Soviet Socialist Republics and Russia (e.g. X-ray telescope for Mir Space Station).

2. Brazil

13. Through the education programme “EDUCA SeRe Project III” for secondary schools, image-maps using images from the China-Brazil Remote Sensing Satellite were developed for remote sensing teaching. The programme’s website (http://www.inpe.br/unidades/cep/atividadescep/educasere/) provides comprehensive educational materials for Portuguese-speaking countries in Latin America and Africa, including image-maps, remote sensing teaching materials and suggestions from school teachers on how to use these materials in classrooms. In addition, free software for geoprocessing is available at the Instituto Nacional de Pesquisas Espaciais (INPE) homepage (http://www.dpi.inpe.br/). These software programmes are called SPRING (Portuguese, Spanish, some English; Windows and Linux version) and TerraLib (explanations provided in English).

3. Canada

14. The Canadian Space Agency (CSA) and its partner, the Canada Centre for Remote Sensing (CCRS), are addressing space education and training through their "Space Awareness and Education Programme" that targets youth and educators in primary and secondary schools. This programme aims to increase scientific literacy among educators and students through web-based projects and distance-learning opportunities. By using videoconferencing and Internet technology, CSA brings engineers, scientists and astronauts into classrooms, exposes students to good and accurate science as presented by "real" scientists, and supports educators by providing them with real-time access to experts. CSA's Educator Training Event provides teachers with opportunities to learn how to incorporate space into their curriculum. In addition to these, CSA provides undergraduate scholarships annually.

15. The CSA web site provides educational information on the Internet for all primary and secondary classroom levels at: http://www.space.gc.ca/asc/eng/youth_educators/educators/resources/resources.asp. The CCRS website also provides learning resources, including remote sensing tutorials and teachers' guides, at: http://www.ccrs.nrcan.gc.ca/ccrs/learn/learn_e.html.

4. China

16. In China, opportunities exist at various levels for students and professionals to develop knowledge of space science and related activities, technologies and applications:

(a) China National Space Administration (CNSA) continuously organizes international training courses and workshops (more information is available at: http://www.cnsa.gov.cn);

(b) Government-operated research academies regularly provide graduate and training courses on space technology, space science and space applications;

(c) Universities in China provide courses on space technology and remote sensing at the bachelor's, master's and Ph.D. levels.

5. Cuba

17. Many centres, such as the Institute of Geophysics and Astronomy, Institute of Terrestrial Geography, Institute of Meteorology and the Institute of Geology and Paleontology, are responsible for carrying out education and research related efforts in the space sciences. These centres provide training courses for pre- and post-graduate students on remote sensing and digital image processing, Global Positioning System (GPS), geographical information systems (GIS), and other space related technologies.

18. The Natural Sciences and Air museums provide areas dedicated to outreach to promote the familiarization and popularization among the general public of space science and its applications.

6. India

19. The Indian Space Research Organization (ISRO) continues to carry out several capacity building initiatives, including the development of distance learning courses on remote sensing, and the training of students and professionals in space-related sciences.

20. The Indian Institute of Remote Sensing (IIRS) was established with the prime objectives of training, education, research and consultancy in remote sensing and GIS applications. It also provides fellowships to the participants of IIRS post graduate diploma courses. Other educational and research institutions in India are encouraged to take up research projects under the sponsored research scheme of the Department of Space to help in developing the skills of young scientists and engineers.

7. Japan

21. Japan's capacity building efforts related to the uses and/or establishment of a better understanding of space, include:

(a) During "Space Day" and "Space Friendship Month," many space-related educational programmes for school children are held, such as the "Children's Composition and Drawing Contest on Space;"

(b) The "cosmic college" for students in grades 5 to 7, which is held every spring and summer, provides opportunities for students to participate in lectures and experiments. The "cosmic college" also includes an "educator course" for teachers at elementary and junior high schools that introduces science education methodologies. An "Advanced technology experience programme" for teachers at technical high schools is also offered and provides experiments on model-rocket making and lectures;

(c) "Satellite Design Competition" also provides valuable opportunities to improve the engineering skills of graduate and undergraduate students;

(d) Institute of Space and Astronautical Science (ISAS), which has been merged into Japan Aerospace Exploration Agency (JAXA), enhances graduate education through lectures and courses on advanced space sciences;

(e) JAXA accepts several students and researchers annually from various countries with fellowships sponsored by the Japan Society for the Promotion of Science (JSPS) (See also: Annex I-2-C-1. "Japan");

(f) Japan, in cooperation with the Asian Institute of Technology (AIT), promotes training for Earth observation data acquisition and holds many seminars and workshops.

8. Peru

22. The Space Studies Centre (CNEE) in the National Commission for Aerospace Research and Development (CONIDA), runs training courses for students, engineers, and university teachers on uses of satellite imagery in applications such as agriculture, forest science geological prospecting and GIS. Remote sensing application contests and symposia for space science and technologies, especially for remote sensing applications, GIS and GPS, are being planned.

9. Syria

23. The General Organization of Remote Sensing (GORS) provides training opportunities at local and regional levels in such fields as geology, hydrology, agriculture, environment, and urban planning through a comprehensive remote sensing education programme, as well as through workshops and training courses.

10. The United States of America

(a) Global Learning and Observations to Benefit the Environment (GLOBE) Programme

24. The GLOBE programme is a hands-on science and education programme that unites students, teachers, and scientists from around the world in study and research about the dynamics of the Earth's environment through a worldwide network of primary and secondary schools. Environmental measurements and data are used in student research and are also available to scientists around the world for their use.

(b) National Aeronautics and Space Administration (NASA)

25. NASA has a comprehensive education programme that addresses students, teachers, university faculty and institutions at all levels of the education system.

26. NASA's strategy is to use the excitement of NASA's missions and programmes to inspire students. NASA also supports educators in their efforts to increase student proficiency in science, technology, engineering and mathematics through the NASA Explorer Academies and with tools and experiences, such as the Educator Astronaut programme. NASA collaborates with education organizations and institutions of higher learning to provide more opportunities for students and faculty to participate in NASA's research. The development of NASA's education efforts are primarily directed to the United States citizens and institutions but many can be accessed by anyone through the Internet, at: (http://www.nasa.gov/audience/foreducators/index.html). NASA has also contributed to the development of the International Space University (ISU), which is developing space science and policy skills for an international workforce.

B. Capacity building activities of Entities of the United Nations system and international organizations

1. United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)

27. ESCAP, located in Bangkok, is now implementing the second phase of the Regional Space Applications Programme for Sustainable Development (RESAP). The mandate of RESAP is to assist in the capacity building efforts of developing countries in the Asia-Pacific region, specifically, in the area of space technology. Particular attention is being given to the use of space technology to support sustainable development, improved quality of life, disaster management, and the bridging of the digital divide. These activities are to be carried out through awareness raising, policy studies, human resources development, promotion of regional cooperative mechanisms on disaster management, pilot projects, meetings, and the exploration of affordable service models.

2. United Nations Educational, Scientific and Cultural Organization (UNESCO)

28. The "Space Education Programme" (SEP) of UNESCO aims at:

(a) Enhancing space subjects in schools and universities, particularly in developing countries;

(b) Providing educators, post-university students and young professionals opportunities to improve knowledge and skills in space science, engineering and space technology applications;

(c) Promoting gender parity in space educational and career-driven activities;

(d) Raising awareness of decision makers, non-scientists and the general public of the relevance of space to everyday life and the benefits of space technology for society;

(e) Contributing to the preparation of the next generation of space workforce.

29. To achieve the goals above, UNESCO is developing a close cooperation with stakeholders such as space agencies, space industries, international and non-governmental space-related organizations, training institutes and organizations of the UN system. The SEP website can be accessed at: http://www.unesco.org/science/earthsciences/sep.htm.

3. Intergovernmental Oceanographic Commission (IOC)

30. The IOC regards remote sensing from space as a key aid to building the capacity of member states to undertake the sustainable development of their coastal seas and environments. In July 2003, the IOC Assembly adopted Resolution "A strategy for remote-sensing in oceanography," which addresses the needs for more access to and training in the use of remotely sensed data from space. The Assembly also decided (i) to organize a series of regional conferences/workshops to establish regional requirements in terms of data access, product development, and training; and (ii) to promote widespread use of appropriate training tools in remote sensing, including the UNESCO Bilko Learning Project on Remote Sensing. IOC is supporting Bilko's further development. Currently, IOC promotes training in the use of remotely sensed data through workshops in different regions with the initial focus being on Africa. IOC co-sponsors the meetings of the International Ocean Color Coordinating Group (IOCCG), which runs training programmes in developing countries. IOC is engaged with other UNESCO Divisions in the project "The application of remote sensing for integrated management of ecosystems and water resources in Africa."

4. Regional centres for Space Science and Technology (affiliated to the United Nations)

31. The following regional centres are affiliated with the United Nations:

- Centre for Space Science and Technology Education in the Asia and Pacific region (CSSTEAP);

- African Centre for Space Science and Technology-in French language (CRASTE-LF);

- African regional Centre for Space Science and Technology Education-in English language (ARCESSTE-E);

- Centre for Space Science and Technology Education in Latin America and the Caribbean (CRECTEALC)

32. The initial emphasis of the Centres has been on in-depth education, research and application programmes, the linking to global programmes and databases, execution of pilot projects, continuing education, and the implementation of awareness and appraisal programmes.

33. The Centres offer post graduate level courses in the fields of:

(a) Remote sensing and geographic information system (GIS),

(b) Satellite communications,

(c) Satellite meteorology and global climate,

(d) Space and atmospheric sciences.

34. A set of standard curricula developed by the United Nations Office for Outer Space Affairs was adapted for these educational programmes.

5. European Space Agency (ESA)

35. Educational activities are categorized as one of the mandatory activities in the European Space Agency (ESA) Convention. They aim to stimulate science and technology literacy among students, to identify and nurture talented individuals for a skilled workforce and to foster linkage and synergies with national players in education, academia and industry.

Development of Human Resources: The Young Graduate Trainee Scheme, design and development of educational tools (e.g. EDUSPACE). ESA plans to enlarge internship opportunities (for international trainees), to make scholarship schemes more comprehensive, to expand educational tools beyond Europe (e.g. EDUSPACE), and to create synergies with international educational programmes (e.g. The GLOBE Programme).

Development of Budgetary Resources: ESA plans to utilize 1% of its International Space Station (ISS) European Exploitation budget for space education.

Development of Professional Skills of Teachers: ESA runs courses for the training and professional development of teachers, including: a physics teaching fair where materials and ideas are exchanged, and EDUSPACE training for teachers. The ”EDUSPACE” website (http://www.eduspace.esa.int) provides educational columns on topics like global change, disaster monitoring, and remote sensing. Annex I-2-C-2. “ESA” contains more information concerning ESA Fellowships.

6. CEOS-WGEdu

36. The CEOS Working Group for Education, Training and Capacity Building in Earth Observation (WGEdu) is the implementing body within CEOS for capacity building activities. The WGEdu aims to strengthen indigenous capacity for greater utilization of satellite Earth Observation data in economic and social development programmes, particularly in developing countries. Among the activities that stand to benefit from an increased use of Earth observation data are those identified in the Plan of Implementation of the World Summit on Sustainable Development. Through its unique membership in the past year, CEOS has made many contributions to the capacity building community, including:

- The development of a web portal site that allows systematic access to information on where to find and how to access a broad range of educational resources;
- The establishment of a resource library of information regarding Earth observation training and education together with an interactive, user-driven, web-based access mechanism;

- The adoption of Satellite Data Principles for Education and Training purposes by CEOS Members. These data principles enable timely and affordable access to data for Earth observation education and training efforts;
- The ongoing contribution to and encouragement of training programmes developed by CEOS Associates, such as the UNESCO, World Meteorological Organization (WMO) and others. CEOS Member agencies were strongly encouraged to contribute to the educational efforts of the CEOS Associates;
- The encouragement of CEOS Member Agencies to support the regional Centres for Space Science and Technology Education, affiliated to the United Nations.

The CEOS WGEdu has established linkages with Action Team 17 of COPUOS, Module 1 of the CEOS WSSD Follow up Programme, the IGOS Partnership and the education programmes of specialized organizations of the United Nations.

C. Capacity building activities of non-governmental organizations (NGOs)

1. International Astronomical Union (IAU)

37. IAU established a commission for astronomy education nearly half a century ago. This commission was reorganized in August 2000 as the "Commission 46"- Astronomy Education and Development. IAU is implementing various activities for astronomical education, such as the explanation of solar-eclipses, providing lecturers of astronomy, supporting young astronomer's airfare to events, publishing a newsletter, and developing "The IAU Handbook on Capacity building".

2. International Institute of Air and Space Law (IIASL)

38. The IIASL is located in the Faculty of Law in Leiden University, the Netherlands, and provides courses related to air and space law. The United Nations Office for Outer Space Affairs and IIASL held a Workshop on capacity building in Space Law in Hague, the Netherlands in November 2002. The objective of this workshop was to promote the understanding, acceptance of and adherence to the United Nations treaties and principles on outer space, and to promote exchange of information on domestic space laws and policies.

3. Space Generation Advisory Council in support of the United Nations Programme on Space Applications (SGAC)

39. The SGAC is implementing capacity building activities that focus on increasing the participation in space activities of the world youth. This is being achieved through:

a) Space education tours in Africa and Bangladesh;

b) Education projects in Latin-America;

c) Pilot projects on space-related applications;

d) Development of the Global Space Education and Outreach Index (GSEOI), a database that aims to catalogue all space education opportunities world wide;

e) Integration of space education into global education curricula;

f) Provision of recommendations to this report, presenting the opinions of young graduates, researchers and students who represent the next generation space workforce.

40. SGAC started its activities in response to the recommendation of UNISPACE III, to create within the framework of COPUOS a consultative mechanism to facilitate the continued participation of young people from all over the world, especially young people from developing countries and young women, in cooperative space activities.

4. International Society of Photogrammetry and Remote Sensing (ISPRS)

41. ISPRS is an NGO devoted to the development of international cooperation for the advancement of photogrammetry and remote sensing and their applications. The scientific and technical works of the ISPRS are being conducted by seven Technical Commissions. One of the commissions is "Education and Communications" and its web site (http://www.commission6.isprs.org/wg1) contains comprehensive details on education and training compiled by ISPRS.

III. Recommendations

42. The Action Team conducted a survey of the member States and permanent observer organizations of the Committee on the Peaceful Uses of Outer Space at its forty-sixth session in June 2003 to determine their capacity building priorities given a defined list of potential action ideas. The survey feedback identified the following areas as capacity building priorities:

Website/database development;

(ii) Youth participation;

(iii) Support and development of regional centres;

(iv) Data access policy-making;

(v) International coordination;

(vi) Budgetary resource mobilization;

(vii) Book/leaflet publication.

43. The Action Team also noted with satisfaction that the CEOS Working Group on Education, Training and Capacity Building had developed draft data principles for the provision of satellite data for education and training purposes. In November 2003, these data principles were formally adopted at the 17th CEOS Plenary Session and now serve to assist the entire space-oriented capacity building community with the provision of space data for education and training activities.

44. For the above priorities on capacity building to be achieved, the Action Team noted the need to look for long-term solutions to today's challenges, and, more importantly, a greater commitment from the space community and local governments to support local and regional space-related education and training activities. Furthermore, the Action Team recommends to the United Nations member States and affiliated organizations that the following detailed list of actions be undertaken.

A. Summary of recommendations

Promote the sharing of educational materials and information.

1-1. Establish an Internet portal site and database.

(See also: "Website and Database Development"(III-B-1, Annex II-A))

The United Nations Office for Outer Space Affairs (UN/OOSA), in cooperation with UNESCO, should establish and maintain an Internet portal site for capacity building. This website should include links to national and international organizations and projects that also contain databases, or catalogues of databases, information and materials useful for space-related education and training. The materials should be made freely available for distribution/downloading. The IAF Space and Education Webpage funded by ESA and IAF and the Education and Training Materials Discovery Web Site of CEOS are very important examples of this kind of effort.

This portal site should also include a component that lists concrete and specific requests from developing countries for data and materials, in order to facilitate the matching of space agency resources with the needs of countries developing their own space-oriented education and training initiatives.

1-2. Promote the provision of data and educational materials.

(See also: "Policy Making on Access to Data and Educational Materials"(III-B-2, Annex II-B))

(a) UN/OOSA should also encourage COPUOS members and countries with experienced space agencies to support and sign the High-Level Agreement on Space Education Materials, which calls for the publication, duplication and translation of space educational materials, copyright free. This Agreement will be prepared by UNESCO and IAF as a result of the IAF/ISU/IAA/UNESCO Expert Workshop on "Bridging Space and Education," which took place at UNESCO Headquarters, Paris in March 2003.

(b) UN/OOSA should encourage CEOS Agencies to provide Earth observation data for free or at the lowest possible cost for educational purposes. This request was also made to CEOS at the Space Policy Summit in Houston in 2002. It is important for CEOS to create a mechanism through which concrete and specific data requests can be facilitated, as noted above in 1-1(b), to enhance data access/availability from providers. Furthermore, satellite data provided through such a mechanism in response to specific requests, should also be catalogued and made available to other organizations via the Internet portal site and database.

2. Coordinate international activities on capacity building.

(See also: "International Coordination"(III-B-3, Annex II-C))

(a) The Office for Outer Space Affairs, in cooperation with UNESCO and others, should strengthen international efforts to coordinate capacity building activities by inviting other agencies and organizations to join such efforts when necessary or appropriate. The informal session of the Inter-Agency Meeting should discuss how to coordinate capacity building activities at the policy level. Members States should be encouraged to contribute human and financial resources to the Office

and UNESCO in order to assist their roles described in these recommendations.

(b) The Office for Outer Space Affairs, in cooperation with UNESCO and others, should assemble a summary of international activities around the world on capacity building for developing countries every year, and offer this information on the portal site mentioned above in 1-1. If available, information on events being planned or considered (especially by developing countries needing assistance) should be included. This activity will help to minimize the overlap of capacity building initiatives and to promote participation or assistance in these activities.

(c) The Office, in cooperation with UNESCO and others, should work to introduce results of the Action Team Capacity Building as inputs into the Group on Earth Observations (GEO) Framework Document, which has placed a significant priority on capacity building.

3. Increase assistance to regional centre activities.

(See also: "Support for the Activities of Regional Centres"(III-B-4, Annex II-D))

(a) Countries with space agencies should create a database of experts who can assist the Regional Centres for Space Science and Technology Education, affiliated to the United Nations, with their capacity building activities and provide this information on their websites. Additionally, countries with space agencies should provide the Regional Centres with available space-oriented education and training materials through the portal site mentioned above in 1-1.

(b) The Regional Centres should consider organizing a series of capacity building workshops in the countries of their respective regions in the near-term. The workshops should be hosted by each country to promote local attendance and distribute the costs of these capacity building initiatives to other countries themselves.

(c) As for securing financial and technical assistance, "Official Development Assistance (ODA)" funding should be further utilized as suggested below in Recommendation 5, or according to the proposal mentioned above in Recommendation 2.

4. Enhance opportunities for ongoing idea exchange on capacity building.

(See also: "Encourage Youth Participation in Space Activities"(III-B-5, Annex II-E))

(a) The Office for Outer Space Affairs and relevant organizations should continue efforts to create opportunities in various regions for the exchange of ideas on capacity building, through periodically held forums, symposiums and workshops, all of which should include a degree of youth participation. One workshop should specifically focus on discussing the status of the implementation of the Action Team 17 Recommendations.

(b) In cooperation with Regional Centres, the Office and UNESCO should form a network mechanism for the continuous exchange of information related to capacity building.

5. Facilitate the augmentation of budgetary resources and fellowships.

(See also: "Augmenting Budgetary Resources and Fellowships"(III-B-6, Annex II-F))

(a) Developing countries should assign a higher priority to space science and technology capacity building initiatives and use donor funds (ODA) to help achieve their capacity building goals. Donor countries should also make efforts to build partnerships with countries requesting assistance, and directly support capacity building through information and resource exchange.

(b) The United Nations should continue to emphasize the importance of building space science and technology capacities in all countries, in order to enable decision makers in both developing and developed countries to work more efficiently together on optimal short- and long-term solutions to national and regional resource management challenges.

6. Prepare and distribute educational booklets.

(See also: "Preparation and distribution of books and leaflets"(III-B-7, Annex II-G))

Educational booklets should be developed and funded by space agencies as an appropriate educational resource for developing countries desiring to obtain a better understanding of space related activities, technologies and applications. These materials should cover the fundamentals of space science, and serve as useful educational tools for young people in all countries. The booklets should be developed by "pooling resources that already exist" rather than generating new information. This effort, along with the databases mentioned above in 1-1 and 1-2, can help develop a library of fundamental space educational materials to be made available quickly with limited resources.

B. Concrete proposed action plan

1. "Web site and Database Development"

(See also: Annex II-A)

Action1. Establish an Internet portal site with links to country and organization web sites.

(a) Countries and space-related organizations should establish and maintain a compilation of web resources that provide education and training information freely available for distribution and downloading, according to the following categories:

a. Materials for policy-makers in various application fields;

b. Materials to generate interest in young people and to aid school teachers;

c. Technical materials suitable for undergraduate students who aim to be experts (including a list of titles and publishing company names of the technical books available that are not accessible online including in the following fields: remote sensing, GIS, meteorology, communication, navigation, space science);

d. Materials for experts training including in the following fields: remote sensing, GIS, meteorology, communication, navigation, space science;

e. Information on education and training projects, according to the above categories.

(b) The Office for Outer Space Affairs, in cooperation with UNESCO and others, should establish an Internet portal site on its homepage that links the web sites of various countries and organizations and contains a search function. This Internet portal site should function as a database, or as a catalogue of databases, with information and materials for education and training. The materials should be made freely available for distribution and downloading. Resources may also be needed to create an ad hoc coordination team to maintain the database, to provide and promote content for the education portal, to act as a point of contact for potential users of the archive of information, to make assessments and evaluations of the techniques used in this service, and to make recommendations based on user observations and feedback.

Action2. Distribute materials to policy makers and young people.

(a) States and space-related organizations should provide the Office for Outer Space Affairs, UNESCO and others with the most suitable materials for policy makers and young people to be archived and made available.

(b) States, as well as national and international organizations, should encourage publishers of space-related education materials (books, journals, etc.) to provide them free or at an affordable cost to developing countries.

(c) Receiving States or space-related institutions are expected to translate such materials into their own languages using the first version of Space Dictionary that was produced by the International Academy of Astronautics (IAA). This dictionary is expected to become available free-of-charge on the IAA web site in early 2004.

Action3. Promote the sharing of materials and data to meet the needs of developing countries.

The Office for Outer Space Affairs, in cooperation with UNESCO and others, should establish a mechanism that enables the efficient sharing of materials and data to meet the needs of developing countries, perhaps through the coordination team and portal concept described above. For example:

(a) Developing countries should submit their concrete and specific needs for data and materials for education and training to the Office or UNESCO.

(b) The Office, UNESCO and national agencies should provide links to the web-portal on their homepages, while other countries and organizations should provide suitable materials for the portal.

(c) Each country and organization should make an effort to provide materials and data to increase the comprehensive nature of the portal.

2. "Policy-making on access to data and educational materials."

(See also: Annex II-B)

Action. Facilitate the building of information-sharing relations between and among States and organizations.

(a) The Office for Outer Space Affairs, in its capacity as Chair of the CEOS Working Group on Education, Training and Capacity Building, should encourage CEOS Members to provide new/recent Earth Observation data at free or lowest possible cost to specific individuals, such as post-graduate students, teachers and researchers, for education, training and capacity building purposes.

(b) The Office and other international organizations involved in space technology applications such as UNESCO, FAO, UNEP, WMO and WHO should create a mechanism, through which concrete and specific data requests are facilitated to guarantee quality use of data and to avoid duplication and abuse of requests, in order to enhance data availability from providers.

(c) The Office should ensure that access to a copy of the data provided for education and training purposes is also provided on the portal/website database mentioned in Annex I so that such data may also be provided to others for education and training, thus increasing the data's usefulness, utility and availability.

(d) Countries requesting data should make every effort to satisfy their data needs, when appropriate, with archived data or other non-real-time data before requesting real-time data. This will help motivate data providers to continue to support education and training efforts with their data contributions and good will.

(e) The UN should encourage all COPUOS members and space-experienced States to support and sign the High-Level Agreement on Space Educational Materials which will be prepared by UNESCO and IAF and which will be submitted to member States for signature. This Agreement will call for the publication, duplication and translation of space educational materials, copyright free.

3. "International Coordination."

(See also: Annex II-C)

Action 1. Strengthen international coordination of capacity building activities.

(a) The Office for Outer Space Affairs, in cooperation with UNESCO and others, should strengthen international efforts to coordinate capacity building activities by inviting other agencies and organizations around the world that are active in space-related areas to join existing international capacity building efforts.

(b) The Inter-Agency Meeting on Outer Space Activities should be able to provide a framework for coordination among the entities of the United Nations system to coordinate capacity building activities at the programme level in space-related areas. However, there is a need to strengthen efforts to achieve coordination at the policy-making level. In this regard, at an open, informal session of the Inter-Agency Meeting, entities of the United Nations system and members of the Committee on the Peaceful Uses of Outer Space should discuss how to achieve coordination of capacity building activities at policy level in space related areas. All members should be encouraged to contribute human and financial resources to the Office or UNESCO in order to assist their roles described in these Action Team recommendations. Outcomes of this discussion should also be used as input into the GEO Capacity Building Subgroup.

(c) Goals of the GEO subgroups on capacity building (with inputs from Action Team 17), data utilization, international coordination, architecture and data access, include:

i. Improvement of coordination of strategies and systems for observations of the Earth and identification of measures to minimize data gaps, with a view to moving toward a comprehensive, coordinated, and sustained Earth observation system or systems;

ii. Coordination of an effort to involve and assist developing countries in improving and sustaining their contributions to observing systems, as well as their access to and effective utilization of observations, data and products, and the related technologies by addressing capacity-building needs related to Earth observations;

iii. Exchange of observations recorded from in situ, aircraft, and satellite networks, dedicated to the purposes of the Declaration that emanated from the Earth Observation Summit in 2003, in a full and open manner with minimum time delay and minimum cost, recognizing relevant international instruments and national policies and legislation;

iv. Preparation of a 10-year Implementation Plan, taking into account existing activities and building on existing systems and initiatives, with the Framework being available by the Tokyo ministerial conference on Earth observations to be held during the second quarter of 2004, and the Plan being available by the ministerial conference to be hosted by the European Union during the fourth quarter of 2004 or first quarter of 2005;

v. Definition of a process to periodically evaluate and revise the 10-year Implementation Plan; and

vi. Conduct of such other activities, consistent with the Declaration, as the members may deem necessary.

Action 2. Contribute annual plans for international capacity building activities.

(a) Countries and organizations should submit plans on international capacity building activities that are being planned or considered to the Office for Outer Space Affairs or UNESCO annually for the next three years. The plans would be categorized on their websites into workshops, forums, trainings, and pilot projects. Each of these can be sub-categorized into general topics such as remote sensing, meteorology, geographical information, natural resources, navigation, communication, disaster management, climate change, space science, and astrophysics. Developing countries should also submit plans on any capacity building activities and specific needs related to those planned events, so that other countries can match their resources with those needs.

Action 3. Assemble and share annual plans for international capacity building activities.

The Office for Outer Space Affairs, in cooperation with UNESCO and others, should put all of the above plans together on a calendar year basis and provide this information on the portal site (See. III-B-1). This effort will help avoid overlap of priorities and activities, as well as facilitate mutual cooperation. Moreover, countries and organizations are also encouraged to consider co-organizing or partnering on planned activities, taking the importance of multilateral co-operation into account.

4. "Support for the Activities of Regional Centres."

(See also: Annex II-D)

Action 1. Encourage more active use of the ODA scheme.

(a) There are voluntary financial resources available from countries with experienced space agencies that could support the Regional Centres for Space Science and Technology Education, affiliated to the United Nations; however, these funds are not sufficient to fulfill the capacity building goals of the Regional Centres. With this in mind, countries with space agencies and assets should endeavor to assist the Regional Centres with financial support and expertise.

(b) It is also important to utilize the regular avenues of donor support, or "Official Development Assistance (ODA)", through which the Regional Centres or their host countries could get financial support, equipment, and access to experts from donor countries. Remote sensing, GIS, and other fields play specific roles in applications areas of disaster management, environmental observation, and land management - all of which are essential management tools for every country. Therefore, the Regional Centres, or their host countries in cooperation with the United Nations, should strongly request donor support and participation in various fields for capacity building on these technologies, as a high priority. Regarding financial and technical assistance, the scheme mentioned in III-B-3 and Annex II-C is also a possibility.

Action 2. Provide materials useful to persuade ODA decision makers.

For capacity building initiatives to be of a higher priority to donors, it is

important for the Regional Centres or their host countries to make donor (ODA) officials more aware of the importance of capacity building priorities, with a specific focus on space science and technology benefits such as the saving of lives and property through more efficient disaster management, environmental observation, and land management. It is therefore urgent that countries with space programmes provide Regional Centres or their host countries with materials and meeting opportunities to prepare materials specifically designed for this purpose. These materials would also be useful to raise public awareness of the importance of space science and its associated technologies.

Action 3. Assemble lists of experts who can contribute to activities of Regional Centres.

(a) In order to enable the Regional Centres to obtain support from countries with space assets and expertise, the Regional Centres should acquaint countries having space programmes with their activities and provide concrete requests for needed assistance through the portal site mentioned in III-B-1 and Annex II-A.

(b) Countries with space assets should also provide a list of space-technology experts by category that can assist in the education and training activities of the Regional Centres. The lists should include contact points and be provided to the Regional Centres through the portal site.

Action 4. Maximize resource usage when planning capacity building workshops.

When the Regional Centres hold workshops, it is important to have as many participants as possible from neighboring countries attend these events, and to reduce the financial burden on each individual country as much as possible. To achieve this, the Action Team proposes that the Regional Centres consider arranging a series of similar workshops within a short time frame for a specific region. Several Each countries in that region could host one of the workshops, thus reducing the financial burden on the Centres. Training experts for these workshops could be provided by developed countries, or organizations already having the needed expertise.

Action 5. Provide all available education and training materials to the Regional Centres for Space Science and Technology Education, affiliated to the United Nations.

To further support the activities of the Regional Centres, countries with space assets should provide the Regional Centres with as many space-related educational materials as possible useful for education, training and capacity building purposes. These materials should also be made available through the portal site mentioned in action 1 of III-B-1 and Annex II-A.

5. "Encourage Youth Participation in Space Activities."

(See also: Annex II-E)

<u>Short-term (within 5 years)</u>

Action 1. The Office for Outer Space Affairs should organize a regional symposium on "Encouraging Youth Participation in Space Activities" with the support of a host country and related international organizations.

From 2000 - 2003, an annual symposium with a focus on Capacity Building had been held in Graz, Austria. Financial support from the Government of Austria, the State of Styria, the City of Graz, the Austrian Federal Ministry for Transport, Innovation and Technology and the European Space Agency (ESA) had helped to make these symposia possible. These events specifically targeted students at university age and young professionals, and served as a model for future symposia to be held in other regions of the world. These symposia should be held periodically on a regional level, similar to the series of GNSS regional workshops or the regional workshops on disaster management.

Action 2. The Committee on the Peaceful Uses of Outer Space should encourage host countries or organizers of space-related conferences to help younger participants participate in and benefit from these conferences.

The Committee should actively inspire and encourage the next generation of space workers by facilitating and supporting their participation in various national, regional and international space-related symposia and conferences around the world.

Mid-term (5 to 10 years)

Action 3. The Office for Outer Space Affairs and Member States, in cooperation with SGAC, should develop an effective feedback tracking system to inquire whether young participants of UN symposia are still involved in space-related activities 5 years later.

(a) The United Nations symposium "Encouraging Youth Participation in Space Activities" offers a unique opportunity to measure the effectiveness of outreach programmes targeting the younger generation and to track the professional paths of the symposia participants to see if they pursued career opportunities in space-related fields. The participants should be contacted approximately 5 years after their participation in the youth symposium. Such feedback on their career outcomes, when available, would provide valuable insights into the realities of the space industry and could help meet the long-term goals of the industry in regards to developing a workforce pipeline for the future.

(b) The development of a database of educational institutions at undergraduate and postgraduate levels in cooperation with SGAC for the purpose of mapping the location of education material providers, users, experts and students, could be useful for monitoring student involvement in space activities. Of particular interest would be their transitions from university to the workplace and the identification of materials and experts to be listed on the portal website.

6. “Augmenting Budgetary Resources and Fellowships.”

(See also: Annex II-F)

Action 1. The United Nations should emphasize the importance of capacity building in space science and technology at the political level.

At the WSSD in Johannesburg in 2002 and at the G-8 Evian Summit in 2003, the importance of capacity building in the fields of space science and technology was confirmed, but only as one of many items on a full agenda. Therefore, the United Nations should continue to further emphasize the importance of capacity building in support of sustainable development priorities.

Action 2. Institutions involved in capacity building activities should consider the findings and recommendations made by Action Team 32 “Identify new and innovative sources of financing to support the implementation of UNISPACE III recommendations.”

Action 3. Countries with experienced space agencies should increase efforts to assist developing countries.

Space agencies should enhance efforts to assist capacity building efforts in developing countries by holding workshops, providing experts, and carrying out pilot projects in cooperation with other countries or related UN entities such as UNESCO.

Action 4. Encourage more active use of the ODA and other funding mechanisms.

(a) Through donors (ODA) and other funding mechanisms, developing countries could get financial support, equipment, access to experts from donor countries, fellowships, and other support for capacity building activities as needed. However, specific requests should be made to donors to assist them in meeting the specific short-term and long-term needs of developing countries.

(b) Developing countries should demonstrate how remote sensing capacity building activities are essential in national and regional efforts focusing on disaster management, environmental observation, water resource management, and land management. Space-based technologies also help policy makers better understand various socio-economic impacts related to natural resources.

(c) Developing countries should therefore strongly request, as high priority, donor support (ODA) and other funding mechanisms for technology development in these application areas. Conversely, donor countries should make efforts to match their resources to as many of these requests as possible.

7. " Preparation and distribution of books and leaflets."

(See also: Annex II-G)

Actions.

(a) Booklets should be published on the following proposed topics:

vii. Fundamentals of orbits, spacecraft, launching techniques (this booklet could be used even for students as an introductory material to any subject on space);

viii. Fundamentals of remote sensing and the present state-of-art in remote sensing satellites of various countries;

ix. Fundamentals of remote sensing applications and the successful remote sensing application programmes across various countries;

x. Fundamentals of communication satellites and their applications with respect to telecommunications, TV broadcasting, VSAT networks etc.;

xi. Launching capabilities and available launcher systems in the world;

xii. Space programmes of various countries and different model/routes taken in the development of programmes;

xiii. A primer on organizing space activities in a developing country starting from the initial definition of requirements; and

xiv. International cooperation in space activities.

(b) Preparation of Material:

i. The Action Team could identify international experts from countries with space experienced agencies to prepare or coordinate the preparation of materials for each booklet. It would be most suitable to identify only one expert per booklet.

ii. The scope of each booklet should concentrate on the fundamental principles and available technologies, covering each field, and include reference to the latest studies on these space-oriented technologies.

iii. The booklets should also contain selected materials for further reading at the end to help guide interested readers to additional related materials.

(c) Who will prepare the contents?

i. Each Action Team Member and/or space agency should be allotted one topic to determine the best person to author each booklet.

ii. If each space agency accepted the responsibility of producing one booklet, the whole set could be easily produced.

(d) Intellectual Property Rights

a. The documents being prepared under this Project should be free of any copyright constraints. If any country wants to translate them into their own language, they should be free to do so. No profit

motive should be allowed for any person/agency preparing the booklet.

b. Initially, the Office for Outer Space Affairs, in cooperation with UNESCO and others, could print 200 to 300 sets for distribution to all UN Member States, and for the information of decision-makers in each country.

c. The language should be simple but with appropriate technical terminology.

Annex Ⅰ

Activities on Capacity-Building of countries and international organizations and Educational and Training Methods and Opportunities (with the input of Volunteer cooperation countries)

Ⅰ-1 Overviews of the activities on capacity-building

A. Ten countries completed the questionnaire distributed by the Action Team to all Member States. The replies received are presented below.

1. Azerbaijan

Azerbaijan has Azerbaijan National Aerospace Agency (ANASA),which was set up to coordinate fundamental and applied researchers in the field of remote sensing(RS)and its applications aiming to help the development of the economy of Azerbaijan. ANASA consists of five scientific and technological enterprises.

ANASA's activities are related with the development of theoretic principles, design/pilot works, and the production of the system for gathering, processing, distribution and application of remote sensing for the purposes of natural resources investigation, land usage, environmental monitoring and disaster forecasting.

ANASA runs a large program of space and remote sensing education at a professional level. Many specialists of ANASA have got a high education in the key universities of Russian and have worked in the famous space structures of the former USSR and Russia(ex. X-ray telescope for Mir space station).

2. Brazil

In the educational program "EDUCA SeRe Peoject Ⅲ" for high schools, using China-Brazil Remote Sensing Satellite, image-maps for remote sensing teaching were developed. The home page (http://www.inpe.br/unidades/cep/atividadescep/educasere/) is in Portuguese and provides very good materials for education for Portuguese speaking countries in Latin America and Africa, such as image-maps, a text about remote sensing and suggestions from schoolteachers how to use these materials in classrooms. In addition to this, free software for geoprocessing software is available at the INPE homepage (http://www.dpi.inpe.br/), such as SPRING (Portuguese, Spanish Windows and Linux version; some explanations are in English)and TERRALIB(there is an explanation in English).

3. Canada

Canadian government established the Canadian Space Agency(CSA) to promote the peaceful use and development of space, to advance the knowledge of space through science and to ensure that space science and technology provide social and economic benefits for Canadians and humanity.

CSA is implementing various space related activities, such as earth observation, space sciences, manned space flight, satellite communications, and space technology, with its partners. As for space education and training, CSA and its partner, the Canada Centre for Remote Sensing (CCRS) are addressing it.

CSA addresses the questions of Capacity Building via a number of its programs. Particularly, "Space Awareness and Education Program" established in 1995 targets youth and educators in primary and secondary school across Canada. This program aims to increase scientific literacy among educators and students and to encourage the latter to pursue both higher education and a career in the areas of science and technology. The program also made it possible to supply age appropriate and curriculum specific learning packages and special web-based projects for educators and students through CSA website. The program offers distance-learning opportunities. Using videoconferencing and Internet technology, the CSA brings our engineers, scientists and astronauts into classrooms across our nation. This helps the organization bridge the gap between the education and scientific communities in our country, exposes our students to good and accurate science as presented by "real" scientists, and supports our educators by providing them with a live resource to whom they can refer questions.

The Space Awareness and Education Program also supports the education community in terms of their professional development. Each summer, educators from across the nation are invited to attend the Canadian Space Agency's Educator Training Event, a 3-day conference where teachers have the opportunity to learn about the Canadian Space Program, refresh their knowledge of science concepts and learn how to

incorporate space into their curriculum as a means of providing an interesting and inspiring learning environment and making science relevant. The Educator Conference is an example of an activity that serves to bridge the gap between the education and science communities, key to ensuring knowledge exchange and knowledge transfer and critical to ensuring a capacity building culture.

The program also covers the provision of seed funding to not-for-profit organizations (NPOs) across the nation that aim to increase awareness of the Canadian Space Program and the scientific literacy of youth.

CSA collaborates efforts to educate youth with representatives of the university community as well as those private sector organizations in Canada with an interest in building a scientifically literate population and aims to contribute to a knowledge-based economy.

For post-secondary and graduate levels of education, CSA, with the National Sciences and Engineering Research Council for Canada (NSERC), provide undergraduate scholarships annually.

4. China

In China, there are various levels and chances provided for the people to learn and study the knowledge related to the activities for space science, space technology and space applications.

(a) Governmental Organs

China National Space Administration (CNSA) will constantly organize international training course and workshop for those experts and scholars from Asia-Pacific Regions cooperated with other space agencies and UN organizations. CNSA is in charge of the development of civil space program of China. (http://www.cnsa.gov.cn)

(b) Government Owned Research Academies

China has different government-operated research academies and institutes with the capability of providing graduate research and training courses in space technology, space science and space applications (e.g. remote sensing, satellite data processing). The research academies like several research academies belonging to China Aerospace Science and Technology Corporation, as well as Chinese Academy of Sciences, etc.

(c) Universities

In China, there are several Universities with the capability of providing courses on space technology and remote sensing for bachelor, master and doctor degrees, such as Beijing University of Aeronautics and Astronautics, Space College of Harbin Institute of Technology, Wuhan University of Survey, etc.

(d) Academic Organizations

Within China, there are many academic organizations with the capability of providing public educations and academic activities for space science, space technology and space applications, especially for the school and junior students.

5. Cuba

The Cuban Commission for Space, belonging to the Ministry of Science, Technology and Environment, has among its functions: to advise the organisms and national institutions regarding the exploration of outer space and its peaceful uses; to establish coordination among these institutions for the purpose of reaching the best development in space research and applications and their use for peaceful purposes; to promote the education and development of scientific and technical personnel in this area and to coordinate space activities with foreign organisms and institutions the.

The centers in charge of carrying out research work and training in space sciences are: Institute of Geophysics and Astronomy, Institute of Tropical Geography, Institute of Oceanography, Institute of Meteorology and the National Center of Seismological Investigations, belonging to the Ministry of Science, Technology and Environment.

The Institute of Geology and Paleontology belonging to the Ministry of High Education, the Center of Petroleum Research, belonging to the Ministry of the Basic Industry and the Managerial Group GEOCUBA stand out among universities and polytechnic institutes that provide education and capacity building.

These centers bring training courses for pre- and post-graduate students in remote sensing digital image processing, GPS, GIS, and others.

Cuba has a museum of Natural Sciences, with areas dedicated to outreach to promote the population's familiarization with the space sciences. The Museum of the Air also has an area dedicated to this purpose.

The received benefits of research and space applications are appreciable, especially in the areas of urban planning, meteorology and water resources, disaster management, agriculture, oceanographic monitoring and the environment.

For Cuba, the invigoration of regional cooperation with the objective of developing space research is of great importance as it results offer very effective specific and practical answers to the necessities of the region.

6. India

Space Research in India is carried out by the Indian Space Research Organization (ISRO) of the Department of Space (DOS) of Government of India. The Department of Space has the primary objective of promoting development and application of space science and technology to assist in all-round development of the nation.

Since 1969, when it was set up, ISRO has established space systems like the INSAT for telecommunication, television broadcasting and meteorological services, and the Indian Remote Sensing Satellites (IRS) for resources monitoring and management. ISRO has also developed the satellite launch vehicles PSLV and GSLV to place these satellites in the required orbits.

Towards capacity building, ISRO/DOS continues to carry out several activities. The important ones are detailed below.

(a) INDIAN INSTITUTE OF REMOTE SENSING

The INDIAN INSTITUTE OF REMOTE SENSING (IIRS) was established with the prime objectives of Training, Education, Research and Consultancy in remote sensing and GIS applications in the following fields.

- Urban and Regional Planning;
- Environment Geology & Natural Hazard Surveys;
- GIS applications;
- Eco-development;
- Watershed Management;
- Water Resources;
- Forestry & Ecology;
- Agriculture and Soils, and
- Geology, Geomorphology & Hydrogeology.

This Institute functions under the parent body of National Remote Sensing Agency (NRSA), of DOS. The Institute offers regular training programs in the above fields of Remote Sensing and GIS.

Apart from this it also provides fellowships to the participants of IIRS Post Graduate Diploma Courses. Today, IIRS is one of the premier Institute in South-East Asia for training of scientific and technical personnel in the above areas.

(b) Participation of other Educational and Research Institutions

Other educational and research institutions in India are encouraged to take up research projects under the sponsored research scheme of DOS and this helps in developing the skills of young Scientists and Engineers in Space related activities.

7. Japan

Japan is implementing all types of space related activities, such as earth observation, space sciences, manned and unmanned space flight, satellite communications, and space technology, mainly with its three space organizations, National Space Development Agency of Japan (NASDA), Institute for Space and Astronautical Science (ISAS) and National Aerospace Laboratory (NAL) with their related organizations. As for capacity-building activities, the following actions are being implemented. In October 2003, these three space organizations were merged into one new space organization, Japan Aerospace Exploration Agency (JAXA). The capacity-building activities are as follows (in age order of education-training object).

(a) Japan's Space Day and Space Friendship Month (Space Education for very young age)

Japan's "Space Day" is held on September 12th and is named after Dr. Mamoru Mohri, Japan's first professional astronaut who flew on the US space shuttle in 1992. The 30 days surrounding "Space Day" is called "Space Friendship Month", and many space-related educational programs for youngsters are held, such as the "Children's Composition and Drawing Contest on Space" and "Satellite Design Competition". For several days during "Space Friendship Month" and "Science and Technology Week", which is held in April, Japan's space organizations open their facilities to the public.

(b) Cosmic-College (Space Education for young age)

Every spring and summer in Japan, "the cosmic college" for students in grades 5 to 7 is held. The cosmic college provides the opportunity for children, who hope to work in space field in future, to learn about space physics, planetary science, space flight and other related subjects through lectures and experiments. During the six-day program, regional classrooms and the NASDA Space Center are connected with satellite links and other telecommunication lines. In summer 2002, about 70 elementary and junior-high school students participated in the "cosmic college".

Since teachers play significant roles in educating students, the "cosmic college" includes an "educator course" for teachers at elementary and junior high schools. Through the course, teachers are introduced to the latest development in space programs and science education methodologies developed by NASDA and space experts. The "Advanced technology experience program" is also offered to teachers at technical high schools. This program provides experiments on model-rocket making and launching, lectures on earth observation data utilization and lunar and planetary exploration.

(c) Satellite Design Competition (Space education for university students)

Furthermore, since 1993, the "Satellite Design Competition" has been providing valuable opportunities to improve the engineering skills of graduate and undergraduate students in basic and applied space research. The students compete against each other for better design concepts and ideas for piggyback satellites. The winner has the chance to launch its satellite by H-IIA launch vehicle. In December 2002, the Whale Ecology Observation Satellite(WEOS), designed by this competition winner, a group of the Chiba Institute of Technology, was launched by H-IIA.

(d) Space Education Course of ISAS (Space education and training for graduate)

In higher education, ISAS, one of the inter-university research institutes, contributes to graduate school education through lectures on advanced space sciences and engineering training courses in order to enhance creativity for innovative space technologies in the 21st century.

(e) International Invitation programs with fellowships (Space Education mainly for Post doctoral)

In order to enhance research ability and professional expertise in space, Japan promotes international invitation programs. Space organizations, such as JAXA, accept several students and researchers annually from various countries with the fellowships sponsored by the Japan Society for the Promotion of Science (JSPS) affiliated to Ministry of Education, Culture, Sports, Science and Technology.

(f) Training for Earth observation data acquisition with AIT (Space Training for experts)

In terms of space technology application, Japan, in cooperation with the Asian Institute of Technology (AIT), promotes training for Earth observation data acquisition by developing curricula, dispatching experts and educational materials for remote-sensing data utilization, and holding seminars and workshop for further use of the Multifunctional Transport Satellite (MTSAT) data.

8. Peru

Peru has the National Commission for Aerospace Research and Development (Spanish abbreviation: CONIDA), which aims to promote the space technology applications, in particular, remote sensing to evaluate the resources and to monitor the environment of Peru.

As for the capacity-building, the Space Studies Center (in Spanish abbreviation: CNEE) in CONIDA, runs training courses for students, engineers, and university teachers. Courses are carried out on the use of satellite images in applications such as agriculture, forest science, geological prospecting, and GIS. For the promotion of capacity-building, remote sensing application contest of Peruvian students and symposium for space science and technology, especially for remote sensing applications, GIS and GPS are being planned.

9. Syria

Syria has the General Organization of Remote Sensing (GORS) in order to promote space application in the fields such as geology, hydrology, agriculture, environment, and urban planning.

GORS has training opportunities on local and regional levels through remote sensing education program, workshops and training courses and through international cooperation in the field of remote sensing applications.

10. United States of America

(a) Global Learning and Observations to Benefit the Environment (GLOBE) Program

The GLOBE program is a hands-on science and education program that unites students, teachers, and scientists from around the world in study and research about the dynamics of the Earth's environment. Over a million GLOBE students in more than 12,000 schools located in over 95 countries are taking important environmental measurements. These data are used in their own student research and are also available to scientists around the world for use in theirs.

The goals of the GLOBE Program are to:

- Increase scientific understanding of the Earth
- Improve student achievement in science and mathematics
- Enhance the environmental awareness of individuals worldwide.

The GLOBE Program is implemented through a worldwide network of primary and secondly schools. This program is an interagency program of National Aeronautics and Space Administration (NASA),National Science Foundation(NSF),Environmental Protection Agency(EPA) and The Department of State. Bilateral agreements establish partnerships between US and its partner countries, which are then responsible for designing program implementation in their own countries (over 100countries).

(b) National Aeronautics and Space Administration (NASA)

As the world's largest space agency, NASA is implementing all types of space related activities under the vision of "to improve life here", "to extend life to there", and "to find life beyond". As for capacity-building, NASA has a comprehensive education program that addresses students, teachers, university faculty and institutions at all levels of the education system. Programs address primary, secondary, and tertiary education. NASA's goal is to inspire the next generation of explorers.

NASA's strategy is to use the excitement of NASA's missions and programs to inspire more students to pursue science, technology, engineering and mathematics (STEM). NASA support educators in their efforts to increase student proficiency in these disciplines through the NASA Explorer Academies. NASA also support educators with tools and experiences that only NASA can provide, such as the Educator Astronaut program. NASA collaborates with education organizations and institutions of higher learning to provide more opportunities for students and faculty to participate in NASA's research with a clear goal of motivating more students to obtain degrees and pursue careers in science, technology, engineering and mathematics areas. NASA's efforts for education are primarily directed to United States citizens and institutions.

As for education, NASA has relevant aspects. First, by providing opportunities and experiences to inspire and prepare the next generation of explorers, NASA is building capacity in the workforce. Second, NASA provides resources and experience to educators to enhance their capacity to educate. Third, through support to university research efforts NASA enhances institutional capacity to support space research. NASA has also contributed to the capacity of the International Space University to contribute to the space activity.

B. Capacity building activities of entities of the United Nations system and international organizations

1. United Nations Economic and Social Commission for Asia and the Pacific (UN/ESCAP)

UN/ESCAP, the UN organization focusing the promotion of economic and social development of Asia and Pacific region, located in Bangkok, Thailand, is now implementing the second phase of Regional

Space Applications Program for Sustainable Development (RESAP). A three-tiered regional cooperative network has been established for implementation of the Programme since 1994. This network is composed of: the Intergovernmental Consultative Committee (ICC) comprising National Focal Points nominated by the governments; four regional working groups on major space technology application fields, namely: Remote Sensing, GIS and Satellite-based Positioning (RSGIS), Satellite Communication Applications (SatCom), Meteorological Satellite Applications and Natural Hazards Monitoring (MetSat), and Space Science and Technology Applications (SSTA); and the Regional Information Service and Education and Training Network (RISEN).

The mandate of RESAP is to assist capacity building of developing countries, particularly least developed countries, in Asia-Pacific region in the applications of space technology for bridging the digital divide in fields as sustainable development, improved quality of life and disaster management.

The capacity building activities under RESAP include following fields:

- **Awareness raising** of policy makers and planners on the potential and capability, accessibility and cost/efficiency of operational space technology applications, and relevant policy issues. A lot of workshops, seminars, and expert group meetings were organized for this purpose.
- **Policy study** aims to provide policy frameworks on major policy issues relevant to operationalization of space technology applications to policy makers and planners for reference and adoption.
- **Human resources development** activities are conducted through the Regional Information Service and Education and Training Network among national space agencies and national institutions, which are producing best practices in space, related applications. Every year UNESCAP provided more than 40 fellowships in support these Technical Cooperation among Developing Countries (TCDC) based long-term, medium-term and short-term training courses. The host countries of these training activities include China, India and Indonesia.
- **Promotion of regional cooperative mechanisms on disaster management using space technology,** with the aims to promote the harmonized provision and utilization of space information tools to support national disaster management efforts;
- **Pilot projects** aim to provide best practices and operationalized modals through regional cooperation.
- **Dialogue forum** for harmonization of regional initiatives on space technology development and applications is to facilitate the harmonization among the initiatives to reduce unnecessary duplication, to enhance cooperation and to create synergy towards its long-term objective for a permanent arrangement for regional cooperation in the Asia-Pacific region, such as a regional space cooperation organization;
- **Exploring affordable service modals** of satellite broadband will be conducted through the cooperation with major communication satellite operators and relevant service providers,

The financial resources for the implementation of the RESAP include three part:

- Regular budget of the United Nations for four professional and three general supporting staff members under the Space Technology Applications Section, Information, Communication and Space Technology Division;
- Regular budget for technical cooperation and TCDC funds for TCDC based human resources development activities. Annually more than 40 fellowships provided;
- Extra budget supporting project based activates are in two major categories:
    - Traditional donor's cooperation funds with UN ESCAP for projects. These countries include China, Japan, Republic of Korea;
    - Project based funds from donor countries (such as France, India, Japan), international organizations (European Space Agency) and other funding agencies.

2. United Nations Educational Scientific and Cultural Organization (UNESCO)

In the field of space education, UNESCO launched the new project, Space Education Project (SEP) in early 2002 in order to:

(a) Enhance education on space subjects and promote their integration in the education curricula, particularly in developing countries

(b) Provide opportunities to teachers to update their knowledge and skills, by assisting them acquire or produce educational materials appropriate to their needs

(c) Encourage the participation of girls and women in space affairs

(d) Raise awareness of the general public of space affairs, particularly to the important contribution of space technology to the society

(e) Contribute to the preparation of the next generation of the space workforce.

For realizing these purposes above, SEP makes the network which links highly-educated students, teachers, public, and decision makers. by utilizing schools ,universities, space agencies, space industries, training centers, and space-related IGOs and NGOs.

3. Intergovernmental Oceanographic Commission (IOC) (Volunteer)

The IOC regards remote sensing from space as a key aid to building the capacity of Member States to undertake the sustainable development of their coastal seas and environments. In July 2003, the IOC Assembly adopted Resolution "A strategy for remote-sensing in oceanography), which addresses the needs for more access to and training in the use of remotely sensed data from space. The Assembly also decided (i) to organize a series of regional conferences/workshops to establish regional requirements in terms of data access, product development, and training; and (ii) to promote widespread use of appropriate training tools in remote sensing, including the UNESCO Bilko Learning Project on Remote Sensing. A comprehensive plan for increasing training in remote sensing, and access to remotely sensed data will be presented to the IOC Executive Council in June 2004. Currently the IOC promotes training in the use of remotely sensed data through workshops in different regions with the initial focus being on Africa. In addition the IOC co-sponsors the meetings of the International Ocean Color Coordinating Group (IOCCG) which runs training programs in developing countries. IOC is currently engaged with other UNESCO Divisions in a Project "The application of remote sensing for integrated management of ecosystems and water resources in Africa". IOC is now supporting the further development of BILKO for the benefit especially of developing countries.

4. Regional Centres for Space Science and Technology Education (Affiliated with the United Nations)

- Centre for Space Science and Technology Education in the Asia and Pacific region (CSSTEAP)
- African Centre for Space Science and Technology-in French language (CRASTE-LF)
- African Regional Centre for Space Science and Technology Education-in English language (ARCESSTE-E)
- Center for Space Science and Technology Education in Latin America and the Caribbean (CRECTEALC)

The initial emphasis of the Centres has been on in-depth education, research and application programs, the linking to the global programs/databases, execution of pilot projects, continuing education, and the implementation of awareness and appraisal programs.

The Centres offer Post Graduate Level Courses in the fields of:

(a) Remote Sensing and Geographic Information System,
(b) Satellite Communications,
(c) Satellite Meteorology and Global Climate,
(d) Space and Atmospheric Sciences.

A set of standard curricula developed by the United Nations Office for Outer Space Affairs was adapted for these educational programs.

5. European Space Agency (ESA)

European Space Agency (ESA) is a regional inter-governmental organization established in 1975 to develop peaceful purposes space programs for Europe and to coordinate national and regional initiatives. Its primary mandate is to serve its member countries, however, international cooperation is a key feature of ESA's policy. Currently,15 European countries are the member of ESA and Canada is an associated country. ESA is implementing various space related activities, such as earth (environment) observation, space sciences, manned space flight, satellite communications, and space technology.

Educational activities are categorized as one of the mandatory activities in the ESA Convention. They aim to stimulate science and technology literacy among youngsters, to identify and nurture talented individuals for a skilled workforce, and to foster linkage and synergies with national actors in education, academia and industry. ESA's educational activities stress the development of human resources, budgetary resources, and professional skills of teachers with the following measures:

(a) Development of Human Resources

- Internship Opportunities (ex: The Young Graduate Trainee Scheme (YGT))
- Scholarship (ex: ISU)
- Additional Training Opportunities (ex: Summer Schools, Post-Doc)
- Hands-on Projects and Outreach Initiatives
- Design, development and exploitation of educational tools (e.g. EDUSPACE, a website for Earth observation for secondary schools in Europe)

ESA plans to enlarge internship opportunities(for international trainees), to make scholarship scheme more comprehensive, to expand educational tools beyond Europe (e.g. EDUSPACE), and to create synergies with international educational programs (e.g GLOBE Program).

(b) Development of Budgetary Resources

ESA is planning1% of ISS European Exploitation budget is devoted to education, causing:

- extension of all related programs
- mechanism to attract additional resources for educational programs (ex:Educational Fund)
- more achievement through cost sharing and enhanced cooperation

(c) Development of Professional Skills of Teachers

ESA runs systems for training and professional development of teachers such as:

(a) Physics on stage (physics teaching fair),which is Europe-wide program for physics educators from 22 European countries with 500 teachers' exchanging materials and ideas.

(b) Teach Space conference

(c) EDUSPACE training for teachers

6. CEOS-WGEdu

The CEOS Working Group for Education, Training and Capacity Building in Earth Observation (WGEdu) is the implementing body within CEOS for capacity building activities. The WGEdu aims to strengthen indigenous capacity for greater utilization of satellite Earth Observation data in economic and social development programmes, particularly in developing countries. Among the activities that stand to benefit from an increased use of Earth observation data are those identified in the Plan of Implementation of the World Summit on Sustainable Development. Through its unique membership in the past year, CEOS has made many contributions to the capacity building community, including:

a) The development of a web portal site that allows systematic access to information on where to find and how to access a broad range of educational resources;

b) The establishment of a resource library of information regarding Earth observation training and education together with an interactive, user-driven, web-based access mechanism;

c) The adoption of Satellite Data Principles for Education and Training purposes by CEOS Members. These data principles enable timely and affordable access to data for Earth observation education and training efforts;

d) The ongoing contribution to and encouragement of training programmes developed by CEOS Associates, such as the UNESCO, World Meteorological Organization (WMO) and others. CEOS Member agencies were strongly encouraged to contribute to the educational efforts of the CEOS Associates;

e) The encouragement of CEOS Member Agencies to support the regional Centres for Space Science and Technology Education, affiliated to the United Nations.

The CEOS WGEdu has established linkages with Action Team 17 of COPUOS, Module 1 of the CEOS WSSD Follow up Programme, the IGOS Partnership and the education programmes of specialized organizations of the United Nations.

C. Capacity building activities of non-governmental organization (NGOs)

1. International Astronomical Union (IAU)

IAU is an international scientific organization having members of professional astronomers from over 50 member countries and some of associate member countries. IAU established a commission for astronomy education nearly half century ago and the commission was reorganized in August 2000, to the "Commission 46"-Astronomy Education and Development, with nine Program Groups. Through these Program Groups, IAU is implementing various activities for astronomical education, such as explaining of solar-eclipse to those who are in the countries with none or low-level astronomy education, sending lecturers of astronomy, supporting young astronomer's airfare, publishing a newsletter, and developing "The IAU handbook on capacity-building".

2. International Institute of Air and Space Law (IIASL)(Volunteer)

IIASL is located in the Faculty of Law in Leiden University, the Netherlands, which provides the courses related with air and space law.

UN and IIASL held a Workshop on Capacity-Building in Space Law in Hague, the Netherlands from 18-21, November, 2002. This is the first UN workshop on space law organized under the UN Program on Space Applications. The objectives of this workshop are to promote understanding, acceptance and implementation of the United Nations treaties and principles on outer space, to promote exchange of information on domestic space laws and policies for the benefit of professionals involved in the development and implementation of those policies and to consider opportunities for university-level studies in space law, with a view to promoting national expertise and capability in this field.

The workshop provided an overview of the United Nations treaties and principles on outer space, examined and compared various aspects of existing national space laws and considered opportunities for university-level studies in space law. This multi-level approach to capacity-building in space law, sought to increase awareness of the international treaties and principles regarding space activities developed under the auspices of the United Nations. This workshop provided a basis for the adherence to the treaties on a practical level through the development and administration of domestic legislation and regulatory regimes. This workshop was successfully conducted with the participation of about 100 attendees from 39 countries and 2 international organizations.

3. Space Generation Advisory Council in support of the United Nations Program on Space Applications (SGAC)

SGAC is implementing capacity-building activities as follows, focusing on increasing the participation of the world youth, especially in developing countries and young women in space activities.

(a) Space education tours in Africa and Bangladesh;

(b) Education projects in Latin-America;

(c) Pilot projects on space-related applications;

(d) Development of the Global Space Education and Outreach Index (GSEOI), a database that aims ro catalogue all space education opportunities world wide;

(e) Integrating space education into global education curricula;

During UNISPACE III, alumni of the International Space University organized and convened the Space Generation Forum (SGF) with over 160 students and young professionals from 60 countries. The

purpose of the SGF was to express the visions and perspectives of youth regarding future space activities and was charged to give this youth input to the deliberations of the UNISPACE III Conference. Five SGF recommendations were included in the Vienna Declaration. One of them was **[**"To create a council to support UN/COPUOS through raising awareness and exchange of fresh ideas by youth. This vision is to employ the creativity and vigor of youth in advancing humanity through the peaceful uses of space."**]** On the basis of this recommendation, the Space Generation Advisory Council (SGAC) started its activities as the dialogue-generator between the United Nations and youngsters of the world.

SGAC provides input to and supports the work of COPUOS, for example in assisting the Action Teams established by COPUOS to implement recommendations of UNISPACE III.

4. International Society of Photogrammetry and Remote Sensing (ISPRS) (Volunteer)

ISPRS is a non-governmental organization devoted to the development of international cooperation for the advancement of photogrammetry and remote sensing and their applications. The scientific and technical works of the ISPRS are being conducted by seven Technical Commissions.

One of the commissions is "Education and Communications" and its web site (http://www.commission6.isprs.org/wg1) contains comprehensive details on education and training compiled by ISPRS.

Ⅰ-2 Educational and Training Methods and Opportunities

Following the growing process of people, the activities or tools for enhancing capacity-building could be written or classified in the following order.

Breed the awareness or curiosity to space itself and space activities.
---- Educational material for kids or rather young persons and for teachers
Provide the opportunities for young persons who want to study space and space activities.
---- Educational materials for students and teachers
---- Scholarships
Provide the opportunities for students to deepen their knowledge or skills.
---- Educational materials
---- Fellowships
---- Information useful to enhance skills in the specific majors
Provide or assist for experts to enhance their specific knowledge or expertise.
--- Training courses
--- Training tools
--- Information directly enhance their specific knowledge or expertise
Provide the opportunities for students, experts, teachers to exchange their views.
---- Workshops
---- International conferences

A. For Children

1. Japan

(a) Japan's Space Day and Space Friendship Month (Space Education)

Japan's "Space Day" is held on September 12th and is named after Dr. Mamoru Mohri, Japan's first professional astronaut who flew on the US space shuttle in 1992. The 30 days surrounding "Space Day" is called "Space Friendship Month", and many space-related educational programs for youngsters are held, such as the "Children's Composition and Drawing Contest on Space" and "Satellite Design Competition". For several days during "Space Friendship Month" and "Science and Technology Week", which is held in April, Japan's space organizations open their facilities to the public.

(b) Cosmic-College (Space Education)

Every spring and summer in Japan, "the cosmic college" for students in grades 5 to 7 is held. The cosmic college provides the opportunity for children, who hope to work in space field in future, to learn about space physics, planetary science, space flight and other related subjects through lectures and experiments. During the six-day program, regional classrooms and the NASDA Space Center are connected with satellite links and other telecommunication lines. In summer 2002, about 70 elementary and junior-high school students participated in the "cosmic college".

Since teachers play significant roles in educating students, the "cosmic college" includes an "educator course" for teachers at elementary and junior high schools. Through the course, teachers are introduced to the latest development in space programs and science education methodologies developed by NASDA and space experts. The "Advanced technology experience program" is also offered to teachers at technical high schools. This program provides experiments on model-rocket making and launching, lectures on Earth observation data utilization and lunar and planetary exploration.

B. For Teachers (Teaching material)

All the teaching materials cannot be shown here because of the page-limitation. The websites which exhibit or show teaching material or resources can be shown here.

1. Brazil

The home page (http://www.inpe.br/unidadas/cep/atividadescep/educasere/) is in Portuguese and provides very good materials for education for Portuguese speaking countries in Latin America and Africa, such as image-maps, a text about remote sensing and suggestions from schoolteachers how to use these materials in classrooms.

2. Canada

(a) CSA site to exhibit the education materials or resources for teachers (educators).

In the following URL, you can see and print the educational information as for Kindergarten and elementary, High school, and all levels..

http://www.space.gc.ca/asc/eng/youth_educators/educators/resources/resources.asp

(b) CCRS site for learning resources

Moreover, in CCRS site, you can see the learning resources including teachers' guides.

http://www.ccrs.nrcan.gc.ca/ccrs/learn/learn/_e.html

3. ESA

ESA has the special website for space-education program"EDUSPACE".In the following URL, ESA offers the explanatory columns such as global change, disaster monitoring, and remote sensing.

http://www.eduspace/esa.int

4. NASA

NASA has the special website for space-education as follows.

http://www.nasa.gov/audience/foreducators/index.html

C. For highly-educated students---Fellowships

1. Japan

Japan has the systems for postdoctoral fellowship for foreign researchers in the Japan Society for Promotion of Science (JSPS).

(JSPS Postdoctoral Fellowships)

(a) Fields of Research

Social sciences, Natural sciences, engineering, and medicine (with aeronautic and space engineering)

(b) Host institutions

Japanese universities, research institutions, or other facilities approved by JSPS

(c) Number of fellowship awards

around 450 fellowships

(d) Eligibility

Researchers of the nations that has diplomatic relation with Japan
With doctorate degree (received within six years)
Having arranged a research plan with his/her Japanese host

(e) Duration

12-24 months

(f) Award Condition

(a) Monthly maintenance allowance of JPY392,000
(b) Round trip air ticket
(c) An annual domestic research allowance of JPY58,500

2. ESA

ESA has two different kinds of postdoctoral research fellowship to a holder of a PhD/Doctorate or equivalent. One is Internal fellowship, the other is External fellowship.

○ Internal fellowships

Internal fellows with research background/experience relevant to ESA research activities or projects are assigned to one of the Agency's establishments; ESTEC, ESOC, ESRIN.

○ External fellowships

External fellows propose to develop a research project,relevant to ESA's research activities at the host institute of their choice, in a country other than their own.

(a) Duration: one year, with the possibility of one more year renewal

(b) Eligibility

-with PhD/Doctorate or equivalent
-working in space science or space applications, space craft techniques, or fields closely connected to space activities
-open to ESA member 15 countries and Canada(Co-operating country)

(c) Amount

<External Fellowships>

The monthly rate of the stipend (before deduction of the contribution to the Social Security Scheme) is presently as follows:

LOCATION	CURRENCY	AMOUNT
AUSTRIA	EURO	2,606.63
BELGIUM	EURO	2,352.56
CANADA	CND	2,715.60
DENMARK	DKK	22,824.60
FINLAND	EURO	2,797.00
FRANCE	EURO	2,675.94
GERMANY	EURO	2,573.54
IRELAND	EURO	2,611.60
ITALY	EURO	2,373.95
NETHERLANDS	EURO	2,577.29
NORWAY	NOK	25,150.80
PORTUGAL	EURO	2,071.91
SPAIN	EURO	2,214.13
SWEDEN	SEK	24199.80
SWITZERLAND	CHF	5512.20
UNITED KINGDOM	GBP	1815.60
UNITED STATES	USD	2881.20

<Internal Fellowships>

Salaries for research fellows in ESA establishments refer to a special category of ESA grades for staff on research assignments. As an indication, basic salaries presently range from:

ESTEC from 2,078.04 EURO to 2.715.71EURO
ESOC from 2,075.27 EURO to 2,711.76EURO
ESRIN from 1,913.60 EURO to 2,501.31EURO

D. Expert Training

1. Japan

In terms of space technology application, Japan, in cooperation with the Asian Institute of Technology (AIT), promotes training for Earth observatory data acquisition by developing curricula, dispatching experts and educational materials for remote-sensing data utilization, and holding seminars and workshop for further use of Multifunctional Transport Satellite (MTSAT) data.

Annex Ⅱ

A. "Web site and Database Development"

1. Background - present status

International organizations, such as the Committee on Earth Observation Satellites (CEOS) and the International Astronautical Federation (IAF), are now making great efforts to establish databases related to space education. In particular, IAF Education Project database funded by ESA and IAF, which will be on the IAF Space and Education Webpage, will contain a list of education projects with details concerning project description, objectives, initiators, partners, existing materials, and web sites links. Moreover, this database can be extended giving further information on experiences about the projects, and best practices. In addition to this, CEOS is now developing the Education and Training Materials Discovery Web Site. The web site will make Earth observation training and education materials created by the CEOS members more searchable, and will provide a source of links (URLs) where students and professionals may find credit courses.

2. Objectives

It is important to establish a web site and database that is categorized adequately and has easy access and search capabilities to necessary materials and data. However, it is not realistic to establish a new big database, because some useful databases already exist. Therefore, the internet portal site for capacity building should be established, with links to web sites of related countries and organizations, which contain database or catalogue database of various information and materials for education and training.

3. Proposed action plan

<Action 1> Establish an Internet portal site with links to country and organization web sites.

(c) Countries and organizations should establish and maintain a compilation of web resources that provide education and training information freely available for distribution and downloading, according to the following categories:

- Materials for policy makers.
- Materials for the generation of interest in young people and for school teachers.
- Technical materials suitable for undergraduate students who aim to be experts (including a list of titles and publishing company names of the technical books available that are not accessible online including the following fields: remote sensing, GIS, meteorology, communication, navigation, space science, etc.)
- Materials for experts training including the following fields: remote sensing, GIS, meteorology, communication, navigation, space science, etc.
- Information on education and training projects, according to the above categories.

(d) UN/OOSA, in cooperation with UNESCO, should establish an Internet portal site on its homepage that links the web sites of various countries and organizations and contains a search function. This Internet portal site should function as a database, or as a catalogue of databases, with information and materials for education and training. The materials should be made freely available for distribution and downloading. Resources may also be needed to create an ad hoc coordination team to maintain the database, to provide and promote content for the education portal, to act as a point of contact for potential users of the archive of information, to make assessments and evaluations of the techniques used in this service, and to make recommendations based on user observations and feedback.

<Action 2> Distribute materials to policy makers and young people.

(d) Countries and organizations should provide UN/OOSA and UNESCO with the most suitable materials for policy makers and young people to be archived and made available.

(e) Countries, as well as national and international organizations, should encourage publishers of space-related education materials (books, journals, etc) to provide them free or at an affordable cost to developing countries.

(f) Countries are expected to translate such materials into their own languages using the first version of Space Dictionary that was made by the International Academy of Astronautics (IAA). This dictionary is planned to be available free on the IAA web site in early 2004.

<Action 3> Promote the sharing of materials and data to meet the needs of developing countries.

UN/OOSA, in cooperation with UNESCO, should establish a mechanism that enables the efficient sharing of materials and data to meet the needs of developing countries, perhaps through the coordination team and portal concept described above. For example:

- Developing countries should submit their concrete and specific needs for data and materials for education and training to UN/OOSA or UNESCO.
- UN/OOSA, UNESCO and national agencies should provide links to the web-portal on their homepage, while other countries and organizations should provide suitable materials for the portal.
- Each country and organization should make an effort to provide materials and data to increase the comprehensive nature of the portal.

B. "Policy Making on Access to Data and Educational Materials"

1. Background

To date, only meteorological data is distributed free of charge and without restriction, and also in the field of astrophysics it is now being prepared to provide data obtained by various telescopes. Earth observation data for urban planning, disaster monitoring, water management, agricultural planning, ocean study, etc. are available only to bodies/entities that receive institutional support or to highly-favored individuals that can commit to a costly price. Similarly, access to educational materials is limited to those who are equipped with the appropriate hardware/software and to those who are speak or understand a universally-spoken language.

2. Objectives

To achieve capacity building in space science and technology, an international strategy on access to Earth Observation data and educational materials is needed to overcome the arising problem of poor access to satellite images and to pedagogical materials concerning space. A policy should be set, with the support of the Ad-hoc Working Group on Education and Training of the Committee on Earth Observation Satellites (CEOS), and as proposed at the Space Policy Summit in Houston in 2002, that purports the donation by space providers of new/recent satellite images to individuals for education, research and development purposes. .

A policy on free distribution, duplication and translation of educational materials is already the subject of a High-Level Agreement on Space Educational Materials being prepared by UNESCO and the International Astronautical Federation (IAF) as a result of the Expert Workshop on "Bridging space and education" organized in UNESCO HQ, Paris in March 2003.

3. Proposed action plan

<Action> Facilitate the building of information sharing relationships between and among countries and organizations.

(f) UN/OOSA, in its capacity as Chair of the CEOS Working Group on Education, should encourage CEOS Members to provide new/recent Earth Observation data at free or lowest possible cost to specific individuals, such as post-graduate students, teachers and researchers, for education, training and capacity building purposes.

(g) UN/OOSA and other international organizations involved in space technology applications such as UNESCO, FAO, UNEP, WMO and WHO should create a mechanism through which concrete and specific data requests are facilitated to guarantee quality use of data and to avoid duplication and abuse of requests, in order to enhance data availability from providers.

(h) UN/OOSA should ensure that access to a copy of the data provided for education and training purposes is also provided on the portal/website database mentioned in Annex1 so that such data may also be provided to others for education and training, thus increasing the data's usefulness, utility and availability.

(i) Countries requesting data should make every effort to satisfy data requests, when appropriate, with archived data or other non-real-time data before requesting real-time data. This will help motivate data providers to continue to support education and training efforts with their data contributions and good will.

(j) The UN should encourage all COPUOS members and space-experienced countries to support and sign the High-Level Agreement on Space Educational Materials which will be prepared by UNESCO and IAF and which will be submitted to Member States for signature. This Agreement calls for the publication, duplication and translation of space educational materials, copyright free.

4. Impediments

(a) Data

Not all CEOS Members may agree to provide new/recent data at free or lowest possible cost to individuals. The resistance may come from the fact that satellite images, especially processed ones, are expensive and are income-generators for affiliate organizations. However, through the proposed mechanism that UN-OOSA in its role as a chair of CEOS Working Group of Education and other international organizations will create, there will be assurance that the data will be used properly and appropriately.

(b) Educational materials

Financial resources is needed to publish educational materials, to transform them from the web to hard copy and to translate them into the national languages/dialects.

C. "International Coordination"

1. Background

There are great number of efforts by many countries and organizations to provide various education and training opportunities on space sciences and technology. Among them, there are some efforts in cooperation among some organizations, such as a series of workshops "Basic Space Sciences" organized by UN/OOSA and ESA, in cooperation with regional centers. But there are also others conducted independently without any coordination with the other organizations. The International Astronomical Union (IAU) holds International School for Young Astronomers (ISYA) twice every three years, to which 20 to 50 students attended, but the total number of participants is very limited. The IAU occasionally organized ISYA in cooperation with COSPAR having more successful school than that individually.

2. Objectives

Objectives of these actions below are to establish a coordination system for an effective or enhanced cooperation among related countries and organizations. Although all the individual organizations have certainly limited budgetary resources, effective cooperation among them will enable to have a greater impact in their efforts. Therefore, UN/OOSA in cooperation with UNESCO should strengthen its international coordination of activities on capacity building by inviting the space related organization in the world to contribute to this effort.

3. Proposed action plan

<Action1> Strengthen international coordination of capacity building activities.

(d) UN/OOSA, in cooperation with UNESCO, should strengthen international efforts to coordinate capacity building activities by inviting other agencies and organizations around the world that are active in space-related areas to join existing international capacity building efforts.

(e) The Inter-Agency Meeting on Outer Space Activities should be able to provide a framework for coordination among the entities of the United Nations system to coordinate capacity building activities at the program level in space-related areas. However, there is a need to strengthen efforts to achieve coordination at the policy-making level. In this regard, at an open, informal session of the Inter-Agency Meeting, entities of the United Nations system and members of the Committee on the Peaceful Uses of Outer Space should discuss how to achieve coordination of capacity building activities at policy level in space related areas. All members should be encouraged to contribute human and financial resources to UN/OOSA or UNESCO in order to assist their roles described in these Action Team recommendations. Outcomes of this discussion should also be used as input into the GEO Capacity Building Subgroup.

(f) Goals of the GEO subgroups on capacity building (with inputs from Action Team 17), data utilization, international coordination, architecture and data access, include:

- Improve coordination of strategies and systems for observations of the Earth and identify measures to minimize data gaps, with a view to moving toward a comprehensive, coordinated, and sustained Earth observation system or systems;
- Coordinate an effort to involve and assist developing countries in improving and sustaining their contributions to observing systems, as well as their access to and effective utilization of observations, data and products, and the related technologies by addressing capacity-building needs related to Earth observations;
- Exchange observations recorded from in situ, aircraft, and satellite networks, dedicated to the purposes of this Declaration, in a full and open manner with minimum time delay and minimum cost, recognizing relevant international instruments and national policies and legislation;
- Prepare a 10-year Implementation Plan, taking into account existing activities and building on existing systems and initiatives, with the Framework being available by the Tokyo ministerial conference on Earth observations to be held during the second quarter of 2004, and the Plan being available by the ministerial conference to be hosted by the European Union during the fourth quarter of 2004;
- Define a process to periodically evaluate and revise the 10-year Implementation Plan; and
- Conduct such other activities, consistent with the Declaration, as the Members may deem necessary.

<Action2> Contribute annual plans for international capacity building activities.

(b) Countries and organizations should submit plans of international capacity building activities that are being planned or considered to UN/OOSA or UNESCO annually for the next three years. The plans will be categorized on their websites into workshops, forums, trainings, and pilot projects. Each of these can be sub-categorized into general topics such as remote sensing, meteorology, geographical information, natural resources, navigation, communication, disaster management, climate change, space science, and astrophysics. Developing countries should also submit plans of any capacity building activities and specific needs related to those planned events, so other countries can match their resources with those needs.

<Action3> Assemble and share annual plans for international capacity building.

(a) UN/OOSA, in cooperation with UNESCO, should put all the above plans together on a calendar year basis and provide this information on the portal site (See. Ⅲ-B-1). This effort will help avoid overlap of priorities and activities, as well as facilitate mutual cooperation. Moreover, countries and organizations are also encouraged to consider co-organizing or partnering on planned activities, taking the importance of multilateral co-operation into account.

4. Impediments

Countries and organizations should be encouraged to contribute human resources and funds to UN/OOSA or UNESCO in order to assist its role as a coordination organization.

D. "Support for the Activities of Regional Centers"

1. Background－present status

In accordance with the resolution (45/72) of the General Assembly of the United Nations in 1990, some regional centers for space science and technology education were established (in Asia and the Pacific (in India), Africa (French Language (in Morocco) and English Language (in Nigeria)) and Latin America and the Caribbean (with two campi, one in Brazil and another in Mexico)). These regional centers are implementing training courses, workshops and other activities with supports by host countries, the United Nations and space experienced countries. Especially training is essential, however, the centers face certain impediments, including shortage of finance, equipment, experts for space science and technology education

For further improvement and enhancement of the capacity in area of the space science and technology in countries of the former Soviet Union and Western Europe, establishment of the educational center (Russian, Turkish and English languages) was also proposed by Azerbaijan.

2. Objectives

The goals of the regional centers are to increase knowledge and understanding on space science and technology and to build and/or enhance national and regional capacity especially by training. Space experienced countries are required to assist the activities of the regional centers towards these goals.

3. Proposed action plan
<Action1> Encourage more active use of the ODA scheme.

(c) There are voluntary financial resources available from countries with experienced space agencies that could support the UN Regional Centres; however, these funds are not sufficient to fulfill the capacity building goals of the UN Regional Centres. With this in mind, countries with space agencies and assets should endeavor to assist the UN Regional Centres with financial support and expertise.

(d) It is also important to utilize the donor support, or "Official Development Assistance (ODA)", through which the UN Regional Centres or their host countries could get financial support, equipment, and access to experts from donor countries, etc. Remote sensing, GIS, and other fields play specific roles in applications areas of disaster management, environmental observation, and land management - all of which are essential management tools for every country. Therefore, the UN Regional Centres, or their host countries in cooperation with UN, should strongly request donor support and participation in various fields for capacity building on these technologies, as a high priority. Regarding financial and technical assistance, the scheme mentioned in Ⅲ-B-3 and AnnexⅢ-C is also a possibility.

<Action2> Provide materials useful to persuade ODA decision makers.

(a) For capacity building initiatives to be of a higher priority to donors, it is important for UN Regional Centres or their host countries to make donor (ODA) officials more aware of the importance of capacity building priorities, with a specific focus on space science and technology benefits such as the saving of lives and property through more efficient disaster management, environmental observation, and land management. It is therefore urgent that countries with space programs provide regional centres or their host countries with materials and meeting opportunities for this purpose. These materials shall also be useful to raise public awareness of the importance of space science and its associated technologies.

<Action3> Assemble lists of experts who can contribute to activities of regional centres.

(c) In order to enable the UN Regional Centres to obtain support from countries with space assets and expertise, UN Regional Centres should acquaint countries having space programmes with their activities and provide concrete requests for needed assistance through the portal site mentioned in Ⅲ-B-1 and Annex Ⅱ-A.

(d) Countries with space assets should also provide a list of space-technology experts by category that can assist in the education and training activities of UN Regional Centres. The lists should include contact points and be provided to the UN Regional Centres through the portal site.

<Action4> Maximize resource usage when planning capacity building workshops.

(a) When the UN Regional Centres hold workshops, it is important to have as many participants as possible from neighboring countries attend these events, and to reduce the financial burden on each individual country as much as possible. To achieve this, the Action Team proposes that the UN Regional Centres consider arranging a series of similar workshops within a short time frame for a specific region. Each country in that region could host one of the workshops, thus reducing the financial burden on the UN Centres. Training experts for these workshops could be provided by developed countries, or organizations already having the needed expertise.

<Action5> Provide all available education and training materials to UN Regional Centres.

(a) To further support the activities of the UN Regional Centres, countries with space assets should provide the UN Regional Centres with as many space-related educational materials as possible useful for education, training and capacity building purposes. These materials should also be made available through the portal site mentioned in action 1 of Ⅲ-B-1 and Annex Ⅱ-A.

4. Others

In order for the graduates of programs at the regional centers to spread their knowledge in their own countries, financial aid and equipment will be necessary in the future, for example, through pilot projects, with support of their own countries, as originally envisaged in the concept for the regional centers, in cooperation with the regional centers or space experienced countries, as necessary.

E. "Encourage Youth Participation in Space Activities"

1. Background – present status

Based on the Vienna Declaration adopted by UNISPACE III, a series of United Nations symposia entitled "Enhancing the Participation of Youth in Space Activities" were held from 2000 to 2002 in Graz, Austria. The main objective of the symposia was to bring together young space experts from around the world as well as experts from major space education and outreach groups. 73 young people and space experts from 41 countries attended the third and final symposium held from 9 to 12 September 2002 (Reference A/AC.105/793). Although the symposium noted at its conclusion the importance of holding similar events in the future, to date, no specific programme has been planned.

2. Objectives

Dedicated workshops or symposia that target and encourage the university-age group to participate in space activities should be organized, since this age group is the corrective to the aging space workforce. Non-dedicated initiatives, such as providing support for younger trainees to attend international conferences, should also be encouraged. Above all, a system should be devised to track the progress and careers of the younger generation to ascertain if today's trainees will continue to be engaged in space-related activities, for example in their home countries or in international organizations. UNESCO and the Space Generation Advisory Council (SGAC) could provide important support for this type of process.

3. Proposed action plan

Short term (within 5 years)

<Action1>: UN/OOSA should organize a regional symposium on "Encouraging Youth Participation in Space Activities" with the support of the host country and related international organizations.

(a) From 2000-2003, an annual symposium with a focus on Capacity Building has been held in Graz, Austria. Financial support from the Government of Austria, the State of Syria, the City of Graz, the Austrian Federal Ministry for Transport, Innovation and Technology and the European Space Agency (ESA) has helped to make these symposia possible. These events have specifically targeted students at university age and serve as a model for future symposia to be held in other regions of the world. These symposia should be held periodically on a regional level, similar to the GNSS regional workshop or the regional workshop on Remote Sensing.

<Action2> UN/COPUOS should encourage host countries or organizers of various space-related conferences to help younger participants participate in and benefit from these conferences.

(a) UN/COPUOS should actively inspire and encourage the next generation of space workers by facilitating and supporting their participation in various national, regional and international space-related symposia and conferences around the world.

Mid term (5 to 10 years)

<Action3> UN/OOSA and Member States, in cooperation with SGAC, should develop an effective feedback tracking system to inquire whether young participants of UN symposia are still involved in space-related activities 5 years later

(c) The UN symposium "Encouraging Youth Participation in Space Activities" offers a unique opportunity to measure the effectiveness of outreach programs targeting the younger generation and to track the professional paths of the symposia participants to see if they pursued career opportunities in space-related fields. The participants should be contacted approximately 5 years after their participation in the youth symposium. Such feedback on their career outcomes, when available, would provide valuable insights into the realities of the space industry and could help meet the long-term goals of the industry in regards to developing a workforce pipeline for the future.

(d) The development of a database of educational institutions at undergraduate and postgraduate levels in cooperation with SGAC for the purpose of mapping the location of education material providers, users, experts and students, could be useful for monitoring student involvement in space activities. Of particular interest would be their transitions from university to the workplace and the identification of materials and experts to be listed on the portal website.

4. Impediments

Financing participation costs in the symposium for the younger participants will pose the single greatest challenge. If, however, participants only attended conferences held in their regions, the financial burden would decrease significantly and sponsors could likely be found. Additionally, if the issue of financing participant costs were resolved, a number of countries would be more interested in the symposium and perhaps even be inclined to host the symposia.

Tracking the original students over time will no doubt also prove challenging, but the benefits far outweigh the administrative difficulties. Each country should be responsible for tracking its own national participants. This type of information would indicate the long-term effectiveness of our outreach programs and could help us encourage the younger generation to seek and remain in space-related career fields.

F. "Augmenting Budgetary Resources and Fellowships"

1. Background and Objectives

Remote sensing, geographic information system (GIS), satellite communications, and other space fields can greatly contribute to sustainable development in every country. For developing countries to succeed in their space applications objectives, it is critical that they are able to develop the needed capacity. For this, developing countries need to understand the mechanism for using "Official Development Assistance (ODA)" and other funding mechanisms, for the specific purpose of building indigenous capacity.

2. Proposed action plan

<Action1> The United Nations should emphasize the importance of capacity building in space science and technology at the political level.

(a) At the WSSD in Johannesburg in 2002 and at the G-8 Evian Summit in 2003, the importance of capacity building in the fields of space science and technology was confirmed, but only as one of many items on a full agenda. Therefore, the United Nations should continue to further emphasize the importance of capacity in support of sustainable development priorities.

<Action2> Institutions involved in capacity building activities should consider the findings and recommendations made by Action Team 32 "Identify new and innovative sources of financing to support the implementation of UNISPACE III recommendations"

<Action3> Countries with experienced space agencies should increase efforts to assist developing countries.

(a) Space agencies should enhance efforts to assist capacity building efforts in developing countries by holding workshops, providing experts, and carrying out pilot projects in cooperation with other countries or related UN entities such as UNESCO.

<Action4> Encourage more active use of the ODA and other funding mechanisms.

(d) Through donors (ODA) and other funding mechanisms, developing countries could get financial support, equipment, access to experts from donor countries, fellowships, and other support for capacity building activities as needed. However, specific requests should be made to donors to assist them in meeting the specific short-term and long-term needs of developing countries.

(e) Developing countries should demonstrate how remote sensing capacity building activities are essential in national and regional efforts focusing on disaster management, environmental observation, water resource management, and land management. Space-based technologies also help policy makers better understand various socio-economic impacts related to natural resources.

(f) Developing countries should therefore strongly request, as high priority, donor support (ODA) and other funding mechanisms for technology development in these application areas. Conversely, donor countries should make efforts to match their resources to as many of these requests as possible.

3. Impediments

Regarding ODA and other funding mechanisms without requests from developing countries, nothing happens. Moreover, it is necessary to give higher priority to capacity building on space science and technology among many items to request. Therefore, both of developing countries and donor countries should make efforts to make ODA and other funding mechanisms their decision makers aware of the importance of capacity building on space science and technology, which can greatly contribute to disaster management, environmental observation, land management, etc., which are essential for sustainable development in developing countries. It is also urgent that space experienced countries provide developing

countries with various materials available for this purpose.

G. "Preparation and distribution of books and leaflets"

1. Background

Space Agencies and the Space faring nations have a large number of publications on various aspects of Space activities. They include books/technical articles:

(a) On space science and technology
(b) On space applications
(c) On their own Projects

Those literatures, which are available in public domain, are quite useful for the people who are already working in the Space field and who have the Space Programs. However, if a country wants to enter into activities of the Space field and organize themselves, the literature is so voluminous that it is difficult for them to decide on where to start and to get to grips on the subject.

In view of this, Action Team-17 proposes a Project on preparing and publishing a set of book-lets, which will be useful for any country to start the Space activities. Moreover, these will be also good guidelines for young people in experienced countries, who want to be engineers.

A large number of literature are available in the electronic form as CDs from the Space Agencies but book-lets are considered as a very effective way of conveying the essence so that the developing countries need not have to be worried about the tools of information processing right at the beginning.

2. Objectives

The objective of the project is to bring out a set of book-lets on various aspects of Space activities. The set of book-lets should be in a concise form. The fundamentals of various areas of Space activities, how to organize a Space Program in a country should be covered to introduce them to the latest developments in each of the fields. The book-lets are proposed to be prepared by experts in the field drawn from various Space-faring countries, and have to be published through UN-COPUOS/OOSA.

3. Proposed Action Plan
<Action1>
(a) Booklets should be published on the following proposed topics:

- Fundamentals of orbits, spacecrafts, launching techniques,
    - (This booklet could be used even for the students as an introductory material to any subject on space.)
- Fundamentals of remote sensing and the present state-of-art in remote sensing satellites of various countries,
- Fundamentals of remote sensing applications and the successful remote sensing application programs across various countries,
- Fundamentals of communication satellites and their applications with respect to telecommunications, TV broadcasting, VSAT networks etc,
- Launch capabilities and available launcher systems in the world,
- Space programs of various countries and different model/routes taken in the development of programmes,
- A primer on organizing space activities in a developing country starting from the initial definition of requirements, and
- International cooperation on space activities.

(b) Preparation of Material

- The Action Team could identify international experts from countries with space experienced agencies to prepare materials for each booklet. It would be most suitable to identify only one expert per booklet.

- The scope of each booklet should concentrate on the fundamental principles and available technologies, covering each field, and include reference to the latest studies on these space-oriented technologies.
- The booklets should also contain selected materials for further reading at the end to help guide interested readers to additional related materials. For example, a booklet on the space activities of various countries could be written by a person like Mr. Brian Harvey, who has written many books on the space activities of Russia, India, Japan, China, etc.

(c) Who will prepare the contents ?

- Each Action Team Member and/or space agency should be allotted one topic to determine the best person to author each booklet.
- If each space agency accepted the responsibility of producing one booklet, the whole set could be easily produced.

(d) Intellectual Property Rights

- The documents being prepared under this Project should be free of any copyright constraints. If any country wants to translate them into their own language, they should be free to do so. No profit motive should be allowed for any person/agency preparing the booklet.
- Initially, UN/OOSA, in cooperation with UNESCO, could print 200 to 300 sets for distribution to all UN Member States, and for the information of decision makers in each country.
- The language should be simple English but with appropriate technical terminology.

4. Impediments

The only impediments which we foresee for carrying out the Project is luke-warm response from the Space Agencies who may think this level of teaching is not necessary. But publishing of this set of document is an essential first step towards development of Capacity Building. Hence in our action team meetings we should try to get volunteers/enthusiastic people from each Space Agency to work on the Project.