

Union of Soviet Socialist Republics (2), United Kingdom (5) and United States of America (24). Training in the operation and installation of the APT equipment and limited training in the use of APT pictures was also provided.

On fellowships, as referred to in paragraph 67 of the report, WMO has provided 14 fellowships in satellite meteorology.

Page 30, Before section F, add the following new section:

D. Food and Agriculture Organization of the United Nations (FAO)

The primary responsibility for the co-ordination of FAO's activities in the field of remote sensing continued to rest with the Office of the Assistant Director-General, Agriculture Department, where a Remote Sensing Unit was established during the year. Also, under the chairmanship of the Assistant Director-General (Agriculture) the Director-General established an Inter-Departmental Working Group on Remote Sensing.

In November 1974, the World Food Conference recommended the development of several programmes, which will include components of remote sensing and also recommended that "the Technical Advisory Committee\* consider developing an international programme using remote sensing" (resolution 4, section 9 (ii)).

During the year, FAO's remote sensing activities continued to expand, including field activities in satellite sensing, photogrammetry and aerial photo-interpretation in more than 40 countries. Satellite imagery (Landsat-1) was used in over a dozen field programmes and detailed studies were reported from Colombia (forestry), Indonesia, Mali (locust control), Pakistan (flood monitoring), the Philippines (land use) and the Sudan (vegetation typing, soil mapping). Short training courses were provided in the Sudan, Colombia and Nigeria and in co-operation with the United Nations a joint training seminar was held in Egypt. Details on the latter are given in the report contained in document A/AC.105/136.

Page 32, add the following new section:

H. International Labour Organisation (ILO)

Since the ILO and its International Centre for Advanced Technical and Vocational Training (Turin Centre) are developing programmes on education and training in many fields (vocational training, health and safety, management, etc.), close collaboration between UNESCO and ILO may prove useful in broadcasting these educational and training programmes through satellites. The Turin Centre is now active in the production of teaching packages and modules which could be modified into software for retransmission through satellites. Furthermore, in view of the facilities available at the Turin Centre, courses, seminars, practical workshops could be convened at the Centre in collaboration with other specialized agencies provided appropriate funding and equipment is made available.

\* of the Consultative Group on International Agricultural Research (CGIAR).



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COMMITTEE ON THE PEACEFUL USES  
OF OUTER SPACE

SPACE ACTIVITIES AND RESOURCES: A REVIEW OF THE ACTIVITIES AND RESOURCES OF THE UNITED NATIONS, OF THE SPECIALIZED AGENCIES AND OF OTHER COMPETENT INTERNATIONAL BODIES RELATING TO THE PEACEFUL USES OF OUTER SPACE

Addendum

Supplementary information for 1975

Preface

In accordance with an arrangement agreed upon at an ad hoc interagency meeting on space activities held in Geneva in September 1975, the present addendum reflects activities in the area of practical applications only. Information relating to other activities of the organizations within the United Nations system and other international organizations, including background or organizational structure, will be reflected in the revised edition of the Review, to be issued at a later date.

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I. UNITED NATIONS

A. The Committee on the Peaceful Uses of Outer Space

1. During 1975, the Committee on the Peaceful Uses of Outer Space continued its activity in promoting further international co-operation in the scientific and technical as well as legal areas of peaceful uses and exploration of outer space.
2. Under the chairmanship of Mr. Peter Jankowitsch (Austria), with Mr. Ion Datcu (Romania) as Vice-Chairman, and Mr. Luis Paulo Lindenberg Sette (Brazil) as Rapporteur, the Committee met from 9 to 20 June 1975 to consider the reports of its subsidiary bodies: the Legal Sub-Committee, which held its fourteenth session in New York from 10 February to 7 March 1975 and the Scientific and Technical Sub-Committee, which held its twelfth session, also in New York, from 21 April to 2 May 1975. The Committee submitted its report thereon and on other related matters to the thirtieth session of the General Assembly (A/10020).

Activities of the Committee

3. In the course of its eighteenth session the Committee on the Peaceful Uses of Outer Space discussed various matters relating to practical applications of space technology. Acting upon the recommendation of its Scientific and Technical Sub-Committee the Committee endorsed the suggestion that in the area of remote sensing the Secretary-General be requested to undertake certain studies for consideration by the Scientific and Technical Sub-Committee at its thirteenth session. These studies relate to (a) analysis of actual and potential cost benefits in remote sensing; (b) feasibility study on a possible role for the United Nations in a future operational remote sensing system; (c) a preliminary study on the organizational and financial requirements of a space segment for a future operational remote sensing system. It also endorsed the recommendation of its Scientific and Technical Sub-Committee that the Secretary-General be further requested to undertake a survey of user needs in remote sensing and to explore the possibility for establishing, on an experimental basis, an international training centre to assist persons from developing countries in an effective use of remote sensing data. Activities and work programmes carried out in implementation of the recommendations in regard to these studies, as well as the experimental training programme are reported to the thirteenth session of the Scientific and Technical Sub-Committee. <sup>1/</sup> The Committee also approved the United Nations space applications programme for 1976 which consists of the holding of several seminars/workshops/technical panels on specific subjects of practical applications of space technology (see para. 8).

4. The Committee also considered the report of its Legal Sub-Committee on its work concerning the legal implications of two areas of practical applications, namely direct broadcast by satellites and remote sensing. It endorsed the

<sup>1/</sup> See documents A/AC.105/153 to 158.

recommendation of the Sub-Committee that at its forthcoming session priority should be given to these items, in addition to the item on the conclusion of a treaty relating to the Moon.

5. The Committee considered the idea of a conference dedicated to space matters and the possibility that space applications be included in the United Nations Conference on Science and Technology proposed for the late 1970s. It recommended that the Sub-Committee should report on the subject, taking into account the views and suggestions made and options referred to in the replies received from Member States to the questionnaire sent out by the Secretary-General on 13 August 1974 (A/AC.105/142 and Add.1-2) and in the course of statements made in the Sub-Committee, in the Committee and in the General Assembly.

6. The various recommendations of the Committee on these and other matters, as contained in its report (A/10020) were approved by the General Assembly (resolution 3388 (XXX)).

#### B. United Nations Secretariat

##### Outer Space Affairs Division

8. During 1975 the Outer Space Affairs Division has carried out a number of activities related to the implementation of the United Nations space applications programme. It has, in this connexion, assisted in the holding of the following panels/workshops/seminars/winter school in the area of practical applications of space technology:

- United Nations interregional technical seminar on remote sensing application, held in co-operation with Canada and UNESCO in Guelph and Ottawa in May 1975, discussed Canada's experience in the establishment and operation of an integrated multidisciplinary remote sensing programme and the problems other countries might face in establishing a similar programme (A/AC.105/159);

- Joint United Nations/UNESCO regional seminar on satellite broadcasting systems for education and development held in Mexico City in September 1975 designed to provide an opportunity for participants from the Economic Commission for Latin America region to acquaint themselves with national and regional programmes for education and development in various parts of the world utilizing broadcasting techniques and to discuss problems of establishing a regional tele-education system for the countries of Latin America (A/AC.105/160 and Corr.1);

- Regional training seminar sponsored jointly by the United Nations and WMO, held in Nairobi in October 1975; its purpose was to provide training to participants from Member States in the region of the Economic Commission for Africa on the analysis and interpretation of the meteorological satellite data and its application to tropical areas of Africa (A/AC.105/161);

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- United Nations/FAO regional seminar on remote sensing techniques held in Djakarta in November 1975. The purpose of this seminar was to provide training in remote sensing techniques and to promote discussion of those techniques which were potentially useful in operational resource management programmes and to consider how those techniques might be applied in tropical environments in general, and the region of the Economic and Social Commission for Asia and the Pacific, in particular. The general theme was "remote sensing of the tropical environment with respect to land and marine resources (A/AC.105/162).

9. From the above seminars, the idea emerged that in the future, even if it might be found useful to organize general seminars on remote sensing from satellites in countries where the first phase still appeared necessary, priority should be given to responding to the specifically defined needs of countries by providing systematic training and user education.

10. In addition, the Outer Space Affairs Division has prepared the necessary background papers, documentation and reports required by the Scientific and Technical Sub-Committee for its twelfth session held between 21 April and 2 May 1975 as well as those required by the Committee on the Peaceful Uses of Outer Space which held its eighteenth session in June/July 1975.

##### Interdepartmental co-ordination of activity

11. Through a working panel established in 1972, the Outer Space Affairs Division has convened a number of interdepartmental meetings to discuss activities of mutual interest to all the participants on the working panel.

##### Interagency co-ordination

12. During 1975 the co-ordination of activities of organizations within the United Nations system was carried out through the Ad Hoc Inter-Agency Working Group on Space Activities. In response to the recommendation of the Committee on the Peaceful Uses of Outer Space, questions relating to a more effective co-ordination of future activities was discussed at an ad hoc meeting held in Geneva in September 1975. The Ad Hoc Committee agreed on a number of joint recommendations to the Administrative Committee on Co-ordination (ACC) in regard to activities concerned with practical applications of space technology. One of these recommendations concerned the establishment of a permanent ACC Sub-Committee to deal with matters of future co-ordination, which was subsequently endorsed by ACC at its October 1975 meeting. Also agreed on was a recommendation that the organizations within the United Nations system would present an integrated report on its programme and activity during 1976/1977 and later years.

##### Office for Science and Technology

13. During 1975, the Office for Science and Technology continued to carry out programmes related to the work of the Committee on Science and Technology for Development (CSTD). This Committee is preparing a United Nations system science and technology policy which may include recommendations in the field of space technology activities, which could be brought to the attention of the Outer Space Committee.

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14. The General Assembly, at its seventh special session, on 16 September 1975 adopted a resolution on science and technology (resolution 3362 (S-VII), section III: Science and Technology, para. 7) whereby it decided that a United Nations Conference on Science and Technology for Development should be held in 1978-1979 with the main objectives of strengthening the technological capacity of developing countries to enable them to apply science and technology to their own development; adopting effective means for the utilization of scientific and technological potentials in the solution of development problems of regional and global significance, especially for the benefit of developing countries; and providing instruments of co-operation to developing countries in the utilization of science and technology for solving socio-economic problems that cannot be solved by individual action, in accordance with national priorities, taking into account the recommendations made by the Inter-Governmental Working Group of the Committee on Science and Technology for Development.

15. The agenda of this Conference would include such items as "new forms of international co-operation in science and technology" or "science and technology and the future" where the topics of the peaceful uses of outer space and space technology applications for developing countries might be included for consideration by this Conference.

Centre for Natural Resources, Energy and Transport (CNRET)

16. The mineral exploration projects are assisted by the Centre for Natural Resources, Energy and Transport in the selection and acquisition of suitable Landsat imagery for updating and improving base maps for the project areas, studies of regional geological features, and in particular studies of tectonic structural lineaments which, in many cases, have a direct or indirect relationship to mineralization. In addition, CNRET substantially supports the Remote Sensing Centre in Bolivia and its programme of processing and multidisciplinary interpretation of satellite data in the field of natural resources. A similar project in Turkey is awaiting formal approval.

17. A recent study in flood loss management in the Water Resources sector indicates that most recent advances in technologies and research, particularly in remote sensing techniques, offer new opportunities for a breakthrough in the basic phase of flood loss management which, if verified, may be disseminated and applied relatively easily on a world-wide scale in order to considerably increase the efficiency of flood loss management in both rural and urbanized environments.

18. In ocean economics and technology, the applications of satellite data for coastal zone programmes has been discussed and considered in the seminar on tropical remote sensing applications held in Djakarta, Indonesia, during November 1975. The presentation summarized the application of data monitored from space craft altitudes in coastal zone programmes. Special emphasis was given to data obtained from Landsat. The uses of satellite imagery in natural marine resources, coastal management, mapping of coastal areas, water quality and upwelling and currents were described. In addition, the economic benefits of remote sensing imagery from satellites was evaluated for the marine sector.

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19. The agendas and programmes of the two United Nations regional cartographic conferences to take place next year will include remote sensing imagery from satellites, as well as the application of satellite geodesy for the completion of a World Geodetic Datum.

20. In the course of the sixth session of the United Nations Group of Experts on Geographical Names, its Working Group on Extraterrestrial Features in co-operation with a member of the International Astronomical Union (IAU), discussed in detail the preparation of place-names on the moon and other planets for mapping at the scales of 1:250,000 and larger. The representative from IAU explained that his association had already prepared a draft scheme which involved the use of different names for each planet and stressed that any duplication of names should be avoided. The Group of Experts approved the need for close co-operation between them and the IAU working group on planetary system nomenclature. It was suggested that names selected from the English language should be of a form easily convertible into other writing systems. It was also agreed that a standard proposal form was required to allow names to be put forward for consideration in the over-all nomenclature when a general system had been worked out. It was stressed that in order to avoid legal problems and resolve other aspects of planetary nomenclature, toponymists, astronomers and other scientists must work together.

United Nations Environment Programme (UNEP)

21. Present activities involving remote sensing under the Global Environmental Monitoring System (GEMS), co-ordinated by the UNEP Programme Activity Centre on GEMS, include (a) a project on assessment of soil degradation carried out in co-operation with FAO and UNESCO. In its first phase - to be completed by early 1977 - the project will cover Africa north of the equator and the Middle East. It will make use both of information already collected by FAO and UNESCO in the preparation of the world map of soils and of additional data gathered on the ground and by remote sensing methods; and (b) a pilot project on forest cover monitoring, as a preliminary step for a project that will ultimately encompass the whole of the tropical belt. The pilot project covers only a limited area comprising four countries in West Africa, and will be based on the interpretation of both side-looking airborne radar (SLAR) and satellite imagery.

22. Future activities involving remote sensing from aircraft and from satellites are likely to be recommended by a group of government experts that will meet in March 1976 to advise on the design and implementation of the monitoring activities required for the assessment of critical environmental problems related to agriculture and land-use practices.

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C. Regional Commissions 2/

Economic and Social Commission for Asia and the Pacific (ESCAP)

23. The Committee for Co-ordination of Investigations of the Lower Mekong Basin (Mekong Committee) has participated in NASA's experimental earth resource satellite imagery programme, as a principal investigator, since the launching of Landsat I. Preliminary results of the assessment of the imagery, with respect to its potential applications to forestry, hydrology, geology and pedology, and later analytical work, led to the conclusion that analysis of multispectral satellite imagery reveals a wealth of information and detail in soils, forest, land use, flooding and geomorphology.

24. Since 1974, the Mekong Committee has been engaged in a two-year programme of thematic mapping, based on data received from satellites, involving the preparation and printing of three kinds of thematic maps of the lower Mekong basin (a) land use maps, including vegetation cover, (b) land capability maps and (c) hydro-geomorphological maps. It is expected that the first set of thematic maps, at a scale of 1:500,000, with accompanying explanatory notes, will be published in 1976.

25. Since 1975 research work is being undertaken, in co-operation with other institutions, on crop recognition and crop forecasting.

D. United Nations Development Programme (UNDP)

26. Within the framework of its programme of assistance to developing countries, UNDP has funded a number of projects in various aspects of space technology. These projects have all been executed by the United Nations or by one or other of the specialized agencies. Details of such projects are described in the contributions of these bodies to this review.

E. Interagency co-operation consultation: assistance to developing countries

27. The importance of providing adequate training, particularly to the developing countries to enable them to derive the maximum benefits from applications of outer space technology, was pointed out at the twelfth session of the Scientific and Technical Sub-Committee and further emphasized by the Outer Space Committee in the course of its eighteenth session, as well as in the course of the General Assembly at its thirtieth session.

<sup>2/</sup> The activity of the Economic Commission for Africa in regard to the possible establishment of a regional international remote sensing satellite ground receiving and data handling centre is reported in document A/AC.105/155.

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II. ASSISTANCE TO DEVELOPING COUNTRIES

A. GENERAL

International Labour Organisation (ILO)

28. A specific feature of manned outer space activities carried out so far is the outstanding attention devoted to the safe design of the equipment and to the safety of the operations in flight, the reason being in particular that rescue operations are not easily carried out in space. No other branches of activity, with the possible exception of nuclear operations for peaceful uses, have embodied an equivalent degree of safety. Outer space activities have set the standard for the highest attainable levels of safety in technological achievements. The approaches and methods involved are now studied with a view to applying them to traditional activities with severe potential occupational hazards in particular. The ILO is closely following these developments and is prepared to promote their application. A special impetus will be given to these activities to implement a resolution concerning future action of the ILO in the field of working conditions and environment, adopted by the International Labour Conference at its sixtieth session (1975).

International Atomic Energy Agency (IAEA)

29. The agency's main areas of activity related to the peaceful uses of outer space remained unchanged. During 1975 the idea of creating nuclear power stations in outer space with energy transfer to earth discussed at the Sixth International Conference on MHD (magnetohydrodynamics) Energy Generation and at the MHD Closed Cycle Specialists Meeting (June 1975, Washington and Cleveland - United States of America).

Committee on Space Research (COSPAR) of the International Council of Scientific Unions

30. In 1973, COSPAR established an ad hoc Advisory Party on Developing Countries to advise on the activities which might be carried out within COSPAR for the benefit of developing countries.

31. The major activities within COSPAR of interest to these countries are concentrated in its Working Group 6 on Application of Space Research to Meteorology and Earth Surveys, concerned with the application of space-based technology to problems of the Earth and its atmosphere, which are of utilitarian interest to all countries and in offering particular benefits to the developing countries.

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32. The Working Group, in making available new possibilities for better observations from space platforms, contributes to the collection of data useful for decision making.

International Astronautical Federation (IAF)

33. The general theme of the 26th Congress held in Lisbon (Portugal) in September 1975 was "Space and Energy". The topic was introduced by an invited lecture and a forum session on "Space and Energy" and two regular sessions, one dealing with "Space and Energy for Earth"; the other with "Energy for Space". A large place was given to different kinds of application satellites, for example: communication satellites, meteorological satellites, earth and ocean dynamics satellites, and earth observation systems. Closely related to the operation of satellites and space stations were sessions on scientific space craft systems, space transportation problems, and unmanned solar exploration systems. Also on the programme were sessions on space medicine and life support systems, astrodynamics, propulsion, materials and structures, fluid mechanics aspects of space flight, space technology and lighter-than-air systems, and safety in youth rocket experiments, as well as a one-day student conference. Several symposia organized by the International Academy of Astronautics (IAA) and a Colloquium of the International Institute of Space Law (IISL) were held as usual within the framework of the Congress.

34. The programme that is now being planned for the 27th Congress, to be held at Anaheim (California), in October 1976, has as its general theme "A New Era of Space Transportation". Although the topics of many sessions will be similar, the approach will be different and will take into consideration latest developments and prospects.

35. Participation in the activities of IAF by scientists from developing countries is considered particularly desirable, and an IAF Committee on Developing Countries has been set up to see how this objective can best be attained.

B. REMOTE SENSING

United Nations Educational, Scientific and Cultural  
Organization (UNESCO)

Earth sciences

36. First steps are being taken with regard to use of satellite imagery, together with aerial photography, in a number of projects of the International Geological Correlation Programme (IGCP).

Hydrology

37. The use of remote sensing techniques has been and is currently being made in UNESCO hydrology projects supported by UNDP for determining such parameters as zones of ground water discharge into the atmosphere and into the sea, phreatophyte covered areas, etc. The use of satellite-obtained infra-red imagery for river investigations is being studied at present.

Oceanography

38. Training in remote sensing applications, including space remote sensing, is included in the programmes of post-graduate training courses for the students from developing countries, sponsored by UNESCO.

39. UNESCO is examining the possibilities of expanding its activities with regard to training and information in the use of space remote sensing for natural resources research, especially in developing countries. However, any real expansion would require additional financial resources, which are not likely to be available before the next biennium, 1977-1978.

40. In co-operation with the United Nations and Canada, UNESCO cosponsored an interregional training seminar on remote sensing applications, held in Guelph and Ottawa (Canada) in May 1975.

41. Provisions are being foreseen for the co-operation with the United Nations in the organization of training seminars in 1976.

42. UNESCO also prepared the following documentation dealing with the use of satellites for oceanographic research and monitoring:

- Report on 1974 Activities of CINECA/WC-IODE/NOAA Joint Satellite Data Use Experiment (IOC/IODE-VIII/11-Annex I);
- Report of the Ad Hoc Group on Exchange of Satellite and Airborne Sensed Data (IOC/IODE-VIII/11).
- Acquisition of IGOS Data Remote Sensed Observations (IOC-WMO/ITECH-I/21);
- Use of Satellites and Aircraft in the Acquisition of Oceanic Data (IOC-WMO/ITECH-I/21-Add.1);
- Aircraft and Satellite Remote Sensing in Oceanography (IOC-WMO/ITECH-I/21-Add.2).

43. In addition, the UNESCO Journal, Impact of Science on Society, vol. XXIV, No.3 (July-September 1974), entitled "The Earth's Resources: A New Look", contains several articles on satellite applications in science.

Food and Agriculture Organization of the United Nations (FAO)

44. In October 1975 the United Nations Economic Commission for Africa (ECA) convened a meeting in Addis Ababa (Ethiopia) in October 1975 to consider the establishment of a satellite data receiving and processing facility in Africa. At the invitation of ECA, FAO participated in this meeting and will continue to lend its co-operation in this matter.
45. A similar exercise is scheduled by the Economic and Social Commission for Asia and the Pacific (ESCAP), in which FAO has also been invited to participate.
46. Countries to which missions have gone out in the past 12 months specifically to assist with the use of satellite imagery include India, Jordan, Mexico, Nepal, Nigeria, Sierra Leone and Somalia. Computer processing to interpret Landsat imagery has been applied in Colombia; India, Nigeria, Sierra Leone and the Sudan.
47. In October 1975, a mission to India provided a complete software library for processing multispectral data and assisted in getting this operational.
48. A UNDP/FAO technical assistance project has been formulated for Bangladesh, and will soon become operational, by which a close working relationship is to be established between agencies in Bangladesh and the Laboratory for Application of Remote Sensing (IARS) of Purdue University for a survey of winter rice growing areas and other features of importance to agricultural development.
49. In the Sudan, a National Remote Sensing Unit is being established with Canadian bilateral assistance and a complementary UNDP/FAO project which is due to be approved shortly.
50. One of the main applications of the Landsat image index of FAO headquarters is to ascertain the availability and quality of images for the entire range of applications. The remote sensing unit of FAO consistently provides such information to field projects and in response to a virtually continuous demand from a range of governmental and intergovernmental agencies.
51. On the basis of a recommendation of the Scientific and Technical Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space and a subsequent request of the Outer Space Committee concerning the establishment of an experimental international centre which could train and assist persons from developing countries to make the most effective use of remote sensing information, work is in progress for the organization of the first United Nations/FAO training course in this context. The course will be held in Rome, using FAO's facilities, for up to 15 participants from Africa and will last for three weeks. The course will deal with the application of remote sensing to agricultural land-use in semi-arid Africa and will be structured towards solving problems of current concern to the participants.

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52. Technical assistance projects involving applications of remote sensing carried out by FAO alone or in conjunction with UNEP, UNDP, UNESCO and other national or international organizations, were as a rule executed for the benefit of developing countries.

World Bank (International Bank for Reconstruction and Development - IBRD)

53. In this area, and as an international financial institution, the Bank is particularly interested in satellite data analysis.
54. The Bank has employed satellite imagery on more than a dozen projects in the past. The data is related to project identification, project preparation and, in some instances, to project supervision activities of agricultural, irrigation and transportation projects. At present, major projects include a land-use survey of the State of Orissa (India), a reservoir monitoring project in the Near East, several agricultural projects (Burma and Bangladesh), a project for economic planning in Zaire and, most recently, a regional planning project in the Philippines. In many of these projects dealing with agriculture or land use, computer tapes of satellite imagery are purchased from EROS (Earth Resources Observational Satellite) and tape processing is done by a commercial firm.
55. In addition to the above-mentioned projects, a number of others are at various stages of preparation. A major project scheduled for completion some time early in 1976 is a series of 14 Landsat Image Index Maps (1:8,500,000 scale, on a 39 x 61 cm. format) for the developing world. The Bank has adopted a Landsat indexing system which is comprised of a gridding of the earth's surface into paths (orbits) and rows (100 nautical mile interval). The gridded system of nominal scenes (average positions of 100 x 100 nautical mile scenes) is designed for ease of use by those who are interested in finding out what imagery exists for a particular area. The indexing system has been applied to a series of 14 maps showing Landsat coverage for the developing world. Scene cells contain information on the per cent of cloud cover (50 per cent and less), months and years of available imagery.
56. As the Bank's interest in this area is likely to grow, it therefore keeps in touch with the latest developments in the peaceful uses of outer space and it co-operates closely with many bilateral and international organizations, especially those within the United Nations system, on matters of mutual interest.

Committee on Space Research (COSPAR) of the International Council of Scientific Unions

57. One of the activities of COSPAR's Working Group 6 (on Application of Space Research to Meteorology and Earth Surveys) is carried out by its Panel B - Earth Resources and Environment.

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58. Informal discussions of the status of activity in various countries relating to the use of remote sensing techniques in studies of resource management and environmental problems have helped stimulate projects in countries using the observations provided by the Earth resources satellites and have allowed many new specialists from countries not otherwise represented to join COSPAR's activities. The desire to communicate on the possibilities of applying space-based techniques led COSPAR to organize and conduct seminars with special emphasis on applications to various problems existing in Latin America, Asia and Africa.

59. COSPAR, in this connexion, provided a speaker to the United Nations/FAO seminar on tropical remote sensing application held in Indonesia (19-28 November 1975), and has undertaken, in co-operation with WMO and FAO, to organize in 1977 a major symposium on "Satellite Contributions to Food Information Systems" which would deal with food production and changes in weather and climate and soils, mapping of agricultural crops, rangelands and their management, food information systems, marine food production, detection and control of pests and diseases.

60. Moreover, the Working Group has undertaken the task of producing manuals on space-based techniques for Earth resources studies, especially designed for use in developing countries.

International Astronautical Federation (IAF)

61. All meetings of the International Astronautical Federation (IAF), as well as those of the International Academy of Astronautics (IAA), and the International Institute of Space Law (IISL) are open to participants from any country regardless of its stage of development. Participation in the activities of the IAF by scientists from developing countries is considered particularly desirable and an IAF Committee on Developing Countries has been set up to see how this objective can best be attained.

62. The IAF has offered to assist the United Nations in organizing a workshop on remote sensing applications, to be held in the United States of America in September 1976. This workshop is intended especially to train persons from developing countries.

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C. TELECOMMUNICATIONS

International Telecommunication Union (ITU)

Activities of the ITU in the field of technical co-operation

(a) Seminars

63. The organization of seminars on telecommunications has been part of ITU's technical co-operation activities since 1965, and 13 seminars, intended more particularly for newly independent and developing countries have been held under its auspices - two devoted entirely to space communications. The introduction of space communication in maritime radio relations was considered at the seminar on communications in the mobile service, held at Accra in October 1975.

64. These seminars were given financial support by UNDP, which also awarded fellowships to the participants.

(b) Experimental satellite communication earth station (ESCES) at Ahmedabad (India)

65. With the assistance of a UNDP/ITU follow-up project starting in August 1971, the Experimental Earth Station was augmented to participate in the Indian satellite instructional television experiment (SITE), a joint experiment between the Indian Government and the National Aeronautics and Space Administration (NASA) of the United States, the Government of India being responsible for the ground segment and the software and NASA being responsible for the space segment. The experiment which began in July 1975 has used the ATS-6 satellite of NASA to broadcast Indian television programmes to six "clusters" of 400 villages in various parts of India. About 2,400 television sets, located in smaller communities in backward parts of the country, will receive signals directly from the satellite. Television sets in and around some major cities can receive programmes via satellite through rediffusion from terrestrial local transmitters.

66. The experiment thus provides a test for a hybrid system employing both a direct broadcasting satellite and terrestrial transmitters for television. It is expected to produce extremely valuable data to the usefulness and the techno-economic aspects of television broadcasting systems using both terrestrial transmitters and satellite. As such, the experiment has considerable international significance, particularly for developing countries which may like to use space technology for television and telecommunication to support and accelerate national development. The software objectives of the experiment in the field of education and instruction in national priority areas such as agriculture, health and family planning are also extremely important for developing countries. The technical objectives of the experiment are the evaluation of the capabilities of direct television broadcasting from a satellite to augmented television sets, involving the strengthening of national capacity for the design, manufacture, testing, installation, operation and maintenance of ruggedized, low cost village television receivers and general broadcast studio and distribution facilities.

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67. The UNDP/ITU assistance consists of the provision of a technical co-ordinator (approximately 60 man/months), of consultants' expertise for the development and operation of earth station subsystems and other equipment, and of fellowships for the design, operation and maintenance of the more sophisticated studio and distribution equipment. Transmission and studio equipment of about \$US 1 million in cost has also been provided under this project.

68. Experimental television broadcasting transmissions under this programme started on 1 August 1975.

69. (c) Within the framework of the UNDP/Special Fund project REG-233, UNESCO, in association with ITU, was assigned as Executing Agency, to undertake a feasibility study for a regional system of tele-education for the countries of South America through modern means of communication including communication by satellite. The report prepared by ITU experts was completed during 1974 and incorporated in 1975 in UNESCO's final report on the project which was distributed to the countries concerned.

70. (d) Final plans for the development of construction and testing of an air transportable earth station were completed. The co-operation of other agencies is expected to place at the disposal of ITU and the United Nations the necessary air transportable terminal, the satellite space segment usage, large permanent earth terminal and the required ground links for use during the test. Explanatory discussions indicated a desire to co-operate in this humanitarian endeavour.

United Nations Educational, Scientific and Cultural Organization  
(UNESCO)

71. A television production and technical operations training project in India executed by UNESCO, was completed at the end of 1974. In the three-year life-span of the project, more than 400 specialists were trained in a temporary centre in New Delhi, while a permanent centre capable of training more than 200 producers and operators annually was built and opened in Poona in October 1974. Apart from meeting the ongoing staff requirements of the expanding terrestrial television system in India, the project was directly concerned with developing staff for the Indian satellite instructional television experiment (SITE) begun in 1975. Currently a follow-up project financed under Funds-in-Trust for Television Programme Research and Prototype Experimentation is being carried out.

72. An associated UNDP/UNESCO project is training teachers and curriculum specialists in the production and utilization of educational programmes designed for both the satellite project and the continuing requirements of Indian television.

73. A visit to SITE, organized by the United Nations and UNESCO, in conjunction with the Indian Space Research Organization, for representatives from developing countries concerned with planning satellite instructional projects, will take place in January 1976.

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74. Between 1971 and 1975 UNESCO, in co-operation with ITU and with UNDP funds, carried out a major feasibility study of a regional system of tele-education for the countries of South America (known as SERLA). The study was requested by the Governments of Argentina, Bolivia, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela, and covers the educational applications of broadcasting, both in school and out-of-school, and its educational, cultural, legal and organizational implications. The use of a satellite for a regional system of tele-education was one of the options studied. The report was issued at the end of 1975.

75. UNESCO funded the participation of a number of international experts in space communications in a seminar held in Jakarta (Indonesia) in September 1974 on Plans for an Indonesian Domestic Satellite System. The system envisages, in addition to telecommunication facilities, channels for distribution of information and education programmes. In preparation for this, a preliminary UNESCO mission prepared a detailed project for a pre-investment study to be funded by UNDP to assist the Ministry of Education and Culture to adopt the most effective strategy for introducing educational technology.

76. Following the consideration of a preliminary study of a regional satellite system for education, culture and development in African countries south of the Sahara at the joint United Nations/UNESCO seminar in Addis Ababa (October 1973) which recommended as a first step the establishment of national study groups by all interested countries to examine national communication needs in relation to a possible regional satellite system, a further expert meeting will be held in 1976 for those African countries which indicate an interest in pursuing the possibilities of regional co-operation through satellite broadcasting.

77. Following two UNESCO expert missions to the Arab region requested by the Arab States Broadcasting Union in 1971 and 1972 and a decision in principle to establish an Arab satellite system for telecommunications, information, culture and education, a third UNESCO mission visited the region in July/August 1975 to study with national broadcasting organizations their precise needs for the exchange of news and television programmes between countries in the region as well as the possibilities of the satellite system to provide broadcasting transmissions to rural areas in certain countries for education and developmental purposes. The broadcasting requirements for the region are being assessed by the Arab States Broadcasting Union and planned within the context of the Arab telecommunication plan on which the ITU has been advising the Governments of the region.

78. The establishment of a regional network, probably via a dedicated Arab satellite system, linking all Arab States, will revolutionize the communication system in the region, enabling the extension and diversification of broadcasting services and involving innovations which will profoundly affect existing educational and communication practices. UNESCO has been requested to assist in formulating a proposal for a task force of international experts to assist the concerned regional educational and broadcasting organizations in making the necessary preparations to enable their full participation in the satellite system. This software planning project is expected to commence during 1976.

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79. Within the third education development project loan request submitted by the Republic of the Philippines to IBRD/IDA in March 1975, there are proposals for a project which will utilize satellite communication technology for education and information, both in the formal and the non-formal sectors. The Government is studying the possibilities of using space capacity on the Indonesian satellite available in 1977, or a transponder on the INTELSAT satellite, or of gaining access to a direct reception satellite in the not too distant future.

80. As a first step, a workshop on communication technology for education was held in July 1975, financed by UNDP and UNESCO. A pre-investment study financed by the IBRD has been proposed for 12 months, beginning in January 1976.

81. Sri Lanka has requested UNESCO, under its UNDP country programme, to prepare a television development plan. One of the options to be studied is the possible use of available capacity in a satellite system serving one or more countries in the Asian region.

82. UNESCO co-operated with the United Nations in the United Nations/UNESCO seminar on satellite communication held in Mexico (1975), while a similar seminar is being planned in Iran for 1976. These meetings were designed to provide an opportunity for participants to discuss satellite broadcasting systems for information, education and national development.

83. Assistance to Member States in the field of space communication has been carried out in close co-operation with the ITU.

#### Inter-Governmental Maritime Consultative Organization (IMCO)

84. In accordance with an IMCO resolution adopted in 1973, an International Conference on the Establishment of an International Maritime Satellite System was held in London from 23 April to 9 May 1975. Its purpose was to decide on the principle of setting up an international maritime satellite system and, upon acceptance of that principle, to conclude the necessary agreements to give effect to it.

85. The Conference, attended by over 350 delegates from 45 countries and 15 international agencies and other organizations, agreed that in order to improve international maritime communications, there was a need for a world-wide maritime satellite system and for an international intergovernmental organization to administer and manage the system. It also agreed on certain principles concerning the rights and duties of entities designated by Member States to participate in the work of the proposed organization.

86. The Conference invited all countries to consider permitting ship-earth stations to operate in the 1535-1542.5 and 1636.5-1644 MHz bands within harbour limits and other waters under national jurisdiction.

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87. An Inter-Sessional Working Group was established to study certain principles identified at the Conference as requiring further examination. These included the question of relationship between Governments and designated entities; distribution of powers between the Assembly and the Council; type and number of appropriate international instruments; procurement policy; initial investment shares; and capital ceiling.

88. The Conference decided to reconvene a second session in London in February 1976, with a view to reaching an agreement on the establishment of the proposed International Organization for a Maritime Satellite System (Inmarsat).

89. The Inter-Sessional Working Group, which held two of its sessions in London at the invitation of the Government of the United Kingdom and one in Noordwijk (Netherlands) at the invitation of the European Space Agency, adopted a number of draft conventions and agreements for submission to the second session of the Conference. Among the texts adopted were the following:

Draft text of the Convention on the International Maritime Satellite Organization;

Draft text of the Operating Agreement on the International Maritime Satellite Organization;

Draft Protocol on Privileges and Immunities of the International Maritime Satellite Organization;

Draft provisions on Procedures for the Settlement of Disputes (referred to in article 36 of the Convention and article XII of the Operating Agreement);

Report on investment shares and capital ceiling.

90. The Working Group could not consider articles on earth station and approval and utilization of the Inmarsat Space Segment of the Draft Operating Agreement of the International Maritime Satellite Organization within the time at its disposal. It recommended that the second session of the Conference should adopt the annexes attached to its report as the basic working documents for its work.

#### International Labour Organisation (ILO)

91. The use of outer space for direct broadcasting and mass communications may effect considerable changes in the organization and provision of training facilities. For example, rapid advances are being made in low-cost computer-assisted instruction methods. These, coupled with outer space transmission facilities, will inevitably have a profound effect on the over-all training and education scene, especially in less developed countries. The ILO has begun to study the use of closed circuit and outside broadcast television as an effective means of bringing some forms of training to the work place; satellite-channelled programmes could be incorporated in these

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studies. Educational television has already been used to supplement in-plant and in-service training, and could be applied more extensively as part of continuing adult training programmes. More attention could also be devoted to expanding the use of television and other forms of direct broadcasting to bring practical work situations to class-rooms, thus broadening the training process. Outer space transmission of all of the above programmes would provide a whole range of opportunities for reinforcing present efforts towards effective mass communication of technical and other skilled knowledge. Similarly, outer space transmission will have to be viewed as a possible tool in vocational and career orientation programmes.

World Bank (International Bank for Reconstruction and  
Development - IBRD)

92. The Bank's involvement in peaceful uses of outer space in telecommunications is limited to financing of earth stations for satellite communications in a few projects. In addition to Bank financing, such terminals are now routinely purchased and installed in many countries.

93. In a related field dealing with education, the Bank's education projects department retains the services of a mass media specialist who assists the Governments of developing countries in formulating plans for using communication media, including satellites, to upgrade and expand education. It is the Bank's basic policy that the use of satellites be made with discretion, and that the countries should choose the medium most suitable for their requirements. The use of communication or broadcasting satellites has not yet been included in any of the Bank-financed projects, but an increasing number of countries have recently been interested in using satellites for educational broadcasting. Some Bank projects, therefore, include the financing of pre-investment studies which will examine the possibilities of using satellites, among other technology (Indonesia, Pakistan, Philippines). These efforts may eventually lead to the use of communication or broadcasting satellites in future education projects.

94. Under the UNESCO/IBRD co-operative programme, financed jointly by the Bank and UNESCO, the latter takes an active part in organizing project identification and preparation work in the education sector which sometimes include the educational use of mass media. Staff members and consultants working for UNESCO often join the Bank missions or pre-investment studies on educational technology.

95. The education projects department is in the process of preparing a paper on "Radio for education and development", which would examine the potential of educational radio broadcasting via satellite.

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European Space Agency (ESA)<sup>3/</sup>

96. The European Space Agency has been working in the field of sound and television broadcasting by satellites since 1971. In carrying out studies and technical developments under its programme, as well as under the national programmes of its member States, particular attention is paid to the requirements of developing countries.

97. ESA has taken part in, and supported, a number of United Nations meetings devoted to this subject, such as the seminar held at Tokyo (Japan) in March 1974, and the seminar sponsored by the United Nations and UNESCO at Mexico City in September 1975. It also gives technical support to United Nations specialized agencies, such as ITU, in the preparation of the World Administrative Conference on Satellite Broadcasting, planned for January 1977.

98. Detailed definition and development of an operational European Communication Satellite (ECS) will commence in 1976, for a first launch by 1980. Preparations are already under way, with the programme of studies, communications tests, technology development and satellite development activities.

99. The forerunner of this system, ESA's Orbital Test Satellite (OTS) is scheduled to be launched in June 1977; it will be placed into a geostationary orbit at 10° east longitude, and will carry out a number of tests and experiments to confirm the soundness of its general design.

International Telecommunications Satellite Organization (Intelsat)

100. Intelsat's global system is comprised of two operational satellites over the Atlantic Ocean region, and one operational satellite each over the Indian and Pacific Ocean regions - plus an in-orbit space satellite in each region.

101. The current Intelsat IV space craft has a design life of seven years and possesses an operational capacity of approximately 4,000 telephone circuits plus a television channel.

102. The current operations plan for the provision of service in the Atlantic region when the Intelsat IV satellites approach saturation in the near future is to utilize a modified Intelsat IV satellite, known as the Intelsat IV-A, to provide service through mid-1979. Intelsat has contracted for six Intelsat IV-A satellites,

<sup>3/</sup> On 15 April 1975, the European Space Conference approved the texts of a convention setting up the European Space Agency, comprised of Belgium, Denmark, France, the Federal Republic of Germany, the Netherlands, Spain, Sweden, Switzerland and the United Kingdom, with Austria, Canada, Ireland and Norway having an observer status.

The purpose of the Agency is to provide for and to promote, for exclusively peaceful purposes, co-operation among European States in space research and technology and their space application. ESA is formed out of, and takes over, the rights and obligations of the European Space Research Organization (ESRO) and the European Organization for the Development and Construction of Space Vehicle Launchers (ELDO).

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the first of which was launched on 25 September 1975. The IV-A design incorporates an operational capacity of over 6,000 telephone circuits plus a television channel. This increase in capacity is achieved through the reuse of frequency spectrum, with two sets of beams designed with adequate beam isolation.

103. Intelsat recently issued, to an international list of qualified firms, a request for proposals for an Intelsat V series of satellites, which are intended to gradually replace the Intelsat IV-A series, starting in 1979. The principal characteristics of the Intelsat V satellites will include: fourfold use of part of the 6/4 GHz frequency band, through both antenna beam separation and dual polarization concepts; introduction of the 14/11 GHz band for limited coverage in high-traffic regions; and a maximum effective band width of 2280 MHz provided in a total of 27 transponders. As in the past, a single satellite design will be applicable to all three ocean regions of the Intelsat global system.

104. As of 30 September 1975, approximately 6,500 full-time leased voice circuits were in service on the Intelsat system, plus capacity for television and part-time service. The space segment averaged 99.993 per cent continuity of service during 1974, while the continuity of service achieved through earth stations averaged 99.950 per cent.

105. Intelsat will be providing an increasing amount of service for domestic satellite systems. At the present time, service is either being provided or soon will be provided for Algeria, Brazil, Malaysia, Nigeria, Norway and Saudi Arabia. Moreover, Chile, Colombia, India, Iran, the Philippines and Zaire have such utilization under consideration.

106. The earth stations which use the Intelsat system are owned in accordance with the laws and regulations of the countries in which they are located. As of 30 September 1975, 114 antennas were providing full-time service at 89 earth stations in 64 countries.

107. Intelsat's current capitalization is approximately \$US 350 million; its annual revenues approximately \$US 120 million. As of 1 January 1975, the charge per annum for leasing of a full-time unit of satellite utilization, equivalent to one half of a telephone circuit, was reduced from \$US 9,000 to \$US 8,460. This is about one fourth the initial charge of \$32,000 which was set in 1965 and which has been steadily reduced over the last 10 years, and is in sharp contrast to world-wide inflationary trends in other areas.

108. Intelsat provides satellite services to many developing countries, enabling them to meet their national needs for international telecommunications service and, in some instances, for domestic services as well. Intelsat is currently developing a second earth station standard for a smaller-size antenna. This new earth station standard will be particularly well suited to developing countries with relatively small streams of international traffic.

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#### D. METEOROLOGY

##### World Meteorological Organization (WMO)

109. In response to General Assembly resolution 2733 D (XIV) of 16 December 1970, which called upon the World Meteorological Organization to seek ways and means to mitigate the harmful effects of tropical storms, the Sixth Congress of WMO (April 1971) established a Tropical Cyclone Project, and in 1973 an approved Plan of Action was distributed to all member countries. During 1975, WMO continued to carry out activities in implementation of the Tropical Cyclone Project. The primary objectives of the project are as follows:

- Strengthening the present capabilities of detection, tracking and forecasting of tropical cyclones;
- Making more generally available the techniques of quantitative storm-surge forecasting;
- Strengthening flood forecasting capabilities, particularly with respect to flooding associated with tropical cyclones;
- Improving tropical cyclone warning systems;
- Providing support to disaster prevention and community preparedness and related activities;
- Providing basic data on risk of loss by cyclone wind, storm-surge flood and river flood to those who need them for development planning or other purposes.

110. Its plan of action is being implemented partly by the WMO technical commissions, notably through the further development of World Weather Watch (WWW), through instrument development and through research into tropical meteorology, partly by means of studies being carried out by small expert groups into specific problems such as forecasting tropical cyclone intensity and movement, and the prediction of storm surges, and partly by means of programmes organized regionally. The WMO/ESCAP <sup>4/</sup> Typhoon Committee and the WMO/ESCAP Panel on Tropical Cyclones are making encouraging progress in a wide range of activities aimed at mitigating or preventing disaster from tropical cyclones in South-East Asia and in the Bay of Bengal respectively. A separate working group is also studying the problems associated with tropical cyclones in the south-west Indian Ocean. In all these regional programmes considerable attention is given to providing fellowships and training.

111. A two-week seminar on tropical cyclone forecasting techniques and warning systems in Asia and the south-west Pacific was held in Brisbane (Australia) in

<sup>4/</sup> ESCAP: Economic and Social Commission for Asia and the Pacific (formerly ECAFE).

May 1973. In October 1974, a WMO technical conference on typhoon modification was held in Manila (Philippines) and a workshop on the use of meteorological radar took place in Kuala Lumpur (Malaysia) in June 1975.

112. As the successful implementation of the WMO programmes depends to a large extent upon the strengthening of national meteorological, hydrometeorological and hydrological services, particularly in the developing countries, the agency's education and training activities are regarded as a matter of high priority. To this effect, in 1972, a joint United Nations/WMO panel and training seminar on the use of meteorological satellite data was convened in Mexico. Also in co-operation with the United Nations, a training seminar on the interpretation, analysis and use of meteorological satellite data was held in October 1975 in Nairobi (Kenya). This latter was the fifth of its type to be organized by WMO, the first having taken place in Tokyo (1966), the second in Melbourne (1966) and the third in Moscow (1968). The agency is also engaged in the preparation of syllabi and corresponding training materials for the education of meteorological personnel in satellite meteorology.

113. Under the Hydrology and Water Resources Development Programme, a technical review of methods used for snow survey from earth satellites was completed in 1973. Two WMO-sponsored training courses in satellite techniques of snow survey were held in the United States (Suitland, Maryland, 6-10 January 1975) and in Switzerland (Zurich, 20-24 January 1975). The second phase of this project involves intercomparison between satellite techniques and traditional methods. The test period commenced in northern hemisphere countries in January 1975 and in southern hemisphere countries in July 1975. The results will be reviewed at an international workshop on snow studies by satellites proposed to be held in late 1976.

114. The WMO technical co-operation programme covers all the activities of the agency aimed at giving assistance to developing countries and includes:

- Participation in the United Nations Development Programme (UNDP);
- Execution of the WMO voluntary assistance programme (VAP) under which contributions received either in the form of equipment or in financial form (mainly the former) are utilized to assist in:
  - (i) The implementation of the WWW plan;
  - (ii) The granting of long-term fellowships;
  - (iii) The application of WWW in the field of hydrology;
  - (iv) The granting of short-term fellowships for personnel engaged in WWW activities;
  - (v) The support of short-term training seminars for personnel engaged in the WWW activities;

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- Execution of the WMO regular programme for:

- (i) Long-term fellowships;
- (ii) Short-term fellowships;
- (iii) Training of refugees;
- (iv) Regional training seminars and technical conferences.

115. All national meteorological services can benefit greatly from the availability in real-time of satellite images of cloud cover provided by the ITOS (improved TIROS operational satellite) polar-orbiting satellites through the automatic picture transmission (APT) system; already many developing countries have installed APT receiving equipment with assistance from international funds such as UNDP and the WMO VAP.

116. Under UNDP, it is planned to improve existing APT stations in Madagascar and Pakistan and to establish a new station in Malawi. Under VAP, plans are being made to provide and install new APT equipment in the United Republic of Cameroon, Congo, the Khmer Republic (Cambodia) and Pakistan. Requests for the establishment of APT stations under VAP have been received from 13 countries and for the improvement of existing stations from five others.

117. Supported by UNDP, an expert is undertaking a mission in Afghanistan which includes the maintenance and repair of APT receiving equipment. Similar missions are planned for Bangladesh and Nepal, and in the Yemen Arab Republic an APT station will be installed and on-the-spot training in the operation and maintenance of the equipment will be given.

118. UNDP is also supporting six fellowships in the field of satellite meteorology. This includes the use and interpretation of satellite information as well as the operation and maintenance of APT equipment. The fellowships are being awarded to nationals of Afghanistan, Bangladesh, India and Malawi.

119. In addition, support from UNDP is being sought for a symposium in South America and two seminars, one in Europe and one in the south-west Pacific area, on the use of satellite data in meteorological services.

120. Under VAP, the United States will provide training in the interpretation of meteorological data from satellites to meteorological personnel from the Bahamas.

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Committee on Space Research (COSPAR) of the International  
Council of Scientific Unions

121. COSPAR's Working Group 6 (WG.6) conducts activities dealing with meteorology in two regular panels: Panel A, meteorology and climate; Panel C, stratospheric and mesospheric meteorology.

122. In establishing the technical basis for the global observing system for the First GARP Global Experiment (FGGE), to be conducted in 1978-1979, COSPAR is of the view that the co-operation of many countries, including developing countries, will be necessary to enable specialists from these countries to learn about the new observational systems to be implemented for FGGE and which will provide a great improvement in the observational coverage in the sparsely settled and oceanic regions of the world.

123. With the support of UNEP, in August 1974, WMO and ICSU organized an international study conference on the physical basis of climate and climate modelling, which established the observational requirements needed. The Working Group has started to gather technical data on what observations will be available at the end of the 1970s so as to identify what will be missing unless new systems are developed. A study conference on this subject is planned early in 1976. The Working Group is also arranging a comprehensive symposium to take place in that year, co-sponsored by COSPAR, WMO, ICSU, IUGG/IAMAP, 5/ and the American Meteorological Society (AMS) on "Meteorological observations from space: their contribution to the FGGE".

124. In a related field, the Working Group has provided a useful forum for the co-ordination of rocket launchings to study specific features of the stratosphere and mesosphere, which has been particularly beneficial to participants from developing countries, with limited resources, who could schedule the launching of their rockets in well-co-ordinated research efforts.

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5/ ICSU: International Council of Scientific Unions; IUGG: International Union of Geodesy and Geophysics; IAMAP: International Association of Meteorology and Atmospheric Physics.