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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 1974*

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* In accordance with the decision of the Committee, the Review is to be published at least once every three years, with annual supplements in the intervening years. The first issue was published as document A/AC.105/100 and Corr.1 (United Nations publication, Sales No. E.72.I.11), and covered events up to 1971. The first supplement, A/AC.105/100/Add.1, covered events in 1972; the second supplement, A/AC.105/100/Add.2, covered events in 1973. This issue is the third supplement.

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I. UNITED NATIONS

A. Committee on the Peaceful Uses of Outer Space

1. During 1974, 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. In pursuance of the decision of the General Assembly in resolution 3182 (XXVIII) of 18 December 1973, the membership of the Committee was enlarged to 37 with the appointment by the President of the General Assembly on 14 February 1974 of the following nine members: Chile, German Democratic Republic, Germany (Federal Republic of), Indonesia, Kenya, Nigeria, Pakistan, Sudan and Venezuela.
3. Under the chairmanship of Mr. Peter Jankowitsch (Austria), with Mr. Ion Datcu (Romania) as Vice-Chairman, and Mr. Luis Felipe de Seixas-Correa (Brazil) as Rapporteur, the Committee met from 1 to 12 July 1974 to consider the reports of its subsidiary bodies: the Scientific and Technical Sub-Committee, which held its eleventh session in New York from 15 to 26 April 1974 and the Legal Sub-Committee, which held its thirteenth session in Geneva from 6 to 31 May 1974. It also considered the report of the third and final session of the Working Group on Remote Sensing of the Earth by Satellites (25 February-5 March 1974) and of the fifth session of the Working Group on Direct Broadcast Satellites (11-22 March 1974) and submitted its report thereon and on other related matters to the twenty-ninth session of the General Assembly (A/9620).

Activities of the Committee

(a) Legal aspects

4. The main achievement of the Committee in this area and, perhaps, the outstanding feature of its work this year concerns the adoption of the text of a draft convention on registration of objects launched into outer space. The draft convention was worked out primarily in the Legal Sub-Committee which had spent several years negotiating and drafting it. Having reviewed the report on the thirteenth session of the Legal Sub-Committee (A/AC.105/133), the Committee adopted with minor editorial changes the text of the draft convention, as worked out by the Legal Sub-Committee, and decided to submit it to the General Assembly for consideration and adoption. The General Assembly by resolution 3235 (XXIX) of 12 November 1974 adopted the draft convention and requested the Secretary-General to open the Convention for signature and ratification at the earliest possible date. It was opened for signature on 14 January 1975.
5. The Convention provides, inter alia, for a central register of objects launched into outer space to be established and maintained on a mandatory basis by the Secretary-General of the United Nations, which would, in particular, assist in

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their identification and would contribute to the application and development of international law governing the exploration and use of outer space. For that purpose, the Convention provides for the registration by the launching State of objects launched into outer space in an appropriate register maintained by that State and the furnishing of specified details of such launchings to the Secretary-General who shall record such information in a register maintained by him. Types of information to be furnished to the Secretary-General cover such matters as the date and territory or location of launch, basic orbital parameters, including: nodal period, inclination, apogee and perigee; appropriate designator of the space object or its registration number, and general function of the space object. The Convention also provides for a system of voluntary markings of space objects and notification of such to the Secretary-General for registration, and finally, for assistance to States in the identification of objects which have caused damage or which may be of a hazardous or deleterious nature.

6. The Outer Space Committee also discussed at length the progress achieved in its Legal Sub-Committee's deliberation on the draft treaty concerning the moon, to which the Sub-Committee had given priority in its work along with the work on the draft convention on registration in accordance with General Assembly resolution 3182 (XXVIII) of 1973. The Committee was not able to agree on the main outstanding matters relating to the legal status of the natural resources of the moon and, therefore, had to postpone further discussion until the next session of the Legal Sub-Committee when it will receive priority consideration.

7. The Committee also considered the work of the Legal Sub-Committee in the area of direct broadcast satellites along with the work of the Working Group on Direct Broadcast Satellites. The Working Group, which was reconvened in March 1974 with a view to making specific recommendations relating to the work of the Legal Sub-Committee, made a detailed study of the question and outlined a series of draft basic principles governing international co-operation in the field of direct broadcast by satellites. It was able to reach consensus on many of the draft principles that it considered should be elaborated and, where consensus was not considered possible, it recorded in its report (A/AC.105/127) the differing views of its members.

8. Following consideration of the proposals submitted on the subject as contained in the report of the Working Group, the Legal Sub-Committee, through a drafting group, formulated the texts of five principles relating to applicability of international law, rights and benefits of States, international co-operation, State responsibility, and the peaceful settlement of disputes. Having regard to the degree of consensus already achieved and the amount of work yet to be done in the elaboration of principles in the field of direct broadcasting, the Committee decided, in accordance with the recommendation of the Legal Sub-Committee, that the Sub-Committee should continue this work as a priority item at its next session.

9. The Committee noted that there had been a preliminary discussion in the Legal Sub-Committee of the legal implications of surveys of earth resources by remote

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sensing satellites and that some delegations had recorded their views on other agenda items dealing with matters relating to the definition and/or delimitation of outer space and outer space activities, and decided that the Sub-Committee should continue, at its next session, its work on the questions relating to legal implications of earth resources surveys as a priority item on its agenda and also give consideration, as time permitted, to matters relating to the definition and/or delimitation of outer space and outer space activities. The Committee further noted that with regard to all of the legal questions under consideration by the Legal Sub-Committee, a number of proposals and draft principles and treaties had been submitted by several members of the Committee.

(b) Scientific and technical aspects

10. The Committee's consideration of the scientific and technical aspects of international co-operation in outer space centred on the views and recommendations of its Scientific and Technical Sub-Committee and the Working Group on Direct Broadcast Satellites.

(i) Direct broadcast satellites

11. The Committee considered the report of the Working Group on Direct Broadcast Satellites on the work of its fifth session (A/AC.105/127) and did make specific recommendations on the various matters raised in that report.

12. The Committee expressed its appreciation to the Working Group for the important work performed by it in the elaboration of legal principles in this field which helped the Legal Sub-Committee to a considerable extent in its work relating to direct broadcast satellites.

13. The Committee noted that the Working Group had recognized the importance and continuing relevance of the technical consideration of direct broadcast satellites and noted that technical feasibility of direct broadcasting from satellites had moved much nearer to practical realization within the last few years, making it possible to predict with some certainty that operational systems could be made available within the forthcoming decade, as noted in the Working Group's report. It also noted that the Working Group through a drafting group had reviewed and revised, where necessary, the conclusions arrived by it at its first session concerning the technical aspects of direct broadcast satellites.

14. The Committee, taking into account the importance of the previous studies undertaken within the United Nations system in the field of direct broadcast satellites, agreed with the view of the Working Group that there was a need to encourage further in-depth studies on the manner in which direct broadcast satellites can contribute towards social and economic development, including, in particular, that of the developing countries. Such studies should give special attention to the existing and planned infrastructure and to how they might be improved to meet the changing educational and development needs.

15. Several suggestions were made concerning the future work on direct broadcast

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satellites, particularly with reference to the future role of the Working Group. The Committee was unable to reach agreement on those proposals, which were, however, recorded in the report of the Committee.

(ii) Other scientific and technical aspects

16. In reviewing the report of the Scientific and Technical Sub-Committee on its eleventh session, contained in document A/AC.105/131, the Committee supported the recommendations of the Sub-Committee dealing with the various aspects of international co-operation in the technical and scientific field, including those relating to remote sensing of the earth by satellites and the United Nations space applications programme.

(a) Remote sensing of the earth from space

17. On the recommendation of the Scientific and Technical Sub-Committee, which had based its views on the report of the Working Group on Remote Sensing and its Task Force (A/AC.105/125), the Committee requested the Secretary-General to prepare four reports in order to assist the Scientific and Technical Sub-Committee in its consideration of the matter. These reports are as follows: (1) a summary of available cost effectiveness studies; (a) organizational and financial requirements for the establishment of an international centre under United Nations auspices, including the possible need for collection of information such as assessment of global food production and monitoring of the global environment; (3) organizational and financial requirements for the establishment of one or more international regional data storage and dissemination centres under United Nations auspices, including reception facilities and, (4) organizational and financial implications of attaching an education and training facility to the above-mentioned regional centre. ^{1/}

18. The Committee also considered that further studies by the Scientific and Technical Sub-Committee of organizational and financial questions in this field should progress together with consideration by the Legal Sub-Committee of the legal aspects of remote sensing. It also recommended that closer co-operation be established with the United Nations Environment Programme (UNEP) with the view to exploring more thoroughly the role of the United Nations in promoting international co-operation in the monitoring of the human environment, and that the Sub-Committee follow the proposed activities of the Food and Agriculture Organization of the United Nations (FAO) in the use of the technology.

(b) United Nations programme on space applications

19. The Committee also approved the United Nations space applications programme for 1975 (A/AC.105/126), which envisaged, among other things, the continuation

^{1/} These reports have been issued in 1975 with the following symbols:

(1) A/AC.105/139 and Corr.1 and 2; (2) A/AC.105/140; (3) A/AC.105/137 and Add.1; (4) A/AC.105/138.

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of the holding of United Nations panels, seminars and workshops on various aspects of space applications and the administration of fellowships for training offered by Member States. In doing so, the Committee requested the United Nations Expert on space applications to continue to ensure the optimum utilization of the funds allocated, and it agreed with the Scientific and Technical Sub-Committee that the programmes should be reviewed annually to ensure that benefits of space applications could be made available to all countries.

20. The question of expanding the United Nations programme on space applications, as to both content and scope, was discussed. The Committee, noting that the proper and effective co-ordination of such a programme would require further in-depth consideration, requested the Scientific and Technical Sub-Committee to do this at its session in 1975. In this connexion and in an effort to ascertain the scope of the needs of countries for assistance in the area of space applications, the Committee requested the Secretary-General to prepare a comprehensive report covering the areas of interest, priority and specific types of assistance needed and sought by Member States, especially the developing countries, through the help of a questionnaire to be sent to the Member States.

21. The Committee also endorsed the recommendation that a detailed report on types of assistance extended by the United Nations system to developing countries in the field of practical applications of space technology be included as part of this review of activities and resources.

22. Also considered during the discussion relating to future planning of the United Nations programme on space applications was a proposal for the convening of a second United Nations conference on space applications. The matter was discussed on a preliminary basis without any decision thereon being reached, and the Secretary-General was requested to obtain the views of Member States concerning the need for any such conference and its purpose, timing, location, organization and cost.

(c) Exchange of information and education and training

23. The Committee continued to receive information from Member States on their national and co-operative space activities and programmes which are reproduced in document A/AC.105/123 and Add.1-7.

24. The Committee was appreciative of the offers made by the Member States to host panels and seminars and provided fellowships in various disciplines of space applications and space technology, and noted in particular the invitations by Kenya, Japan, Egypt, Brazil and Indonesia to host panels/seminars/workshops and the fellowships for training in the practical applications of space technology offered by Brazil, France, Italy, Japan, the United Kingdom and the United States.

25. In recommending that Member States continue to participate in space applications programmes and to utilize the fellowship offers of Member States, the Committee again emphasized that a regional or wider basis for holding these

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panels/seminars/workshops should be sought, so that the dissemination of information and the sharing of experience could be made available to as many candidates as possible.

(d) International sounding rocket launching facilities

26. The Committee shared the satisfaction expressed by the Sub-Committee with the work carried out at the Thumba Equatorial Rocket Launching Station of the Vikram Sarabhai Space Centre in India and the CELPA Mar del Plata Rocket Launching Station in Argentina, and recommended that the General Assembly continue United Nations sponsorship of the two ranges.

(e) Other matters

27. Taking note of the views of the Sub-Committee regarding its future role and work, the Committee endorsed the recommended priorities for the work programme of the Sub-Committee, namely: questions relating to remote sensing of the earth from space; consideration and review of the United Nations programme on space applications; possibility of convening a United Nations conference on space applications; and review of the future role of the Sub-Committee.

28. The Committee also briefly considered the question of the use by satellites of positions in geostationary orbit in view of the growing number of satellites to utilize such orbit and requested the United Nations agencies having existing responsibilities or programmes of studies in that area to provide the Sub-Committee at its next session with background information brought up to date on this subject.

B. United Nations Secretariat

Outer Space Affairs Division

29. During 1974, the Outer Space Affairs Division, as the Secretariat unit responsible for assisting the Secretary-General in carrying out the United Nations responsibility for international co-operation in the peaceful uses of outer space, continued to implement the decisions and recommendations concerning this field made by the General Assembly and the Committee on the Peaceful Uses of Outer Space.

30. The Division, in this connexion, provided substantive secretariat services, including the preparation of background documentation and reports during the third and final session of the Working Group on Remote Sensing of the Earth by Satellites and its Task Force held in February/March 1974; the fifth session of the Working Group on Direct Broadcast Satellites in March 1974; the eleventh session of the Scientific and Technical Sub-Committee in April 1974 and the seventeenth session of the Committee on the Peaceful Uses of Outer Space in July 1974. It assisted the secretariat of the First Committee during the consideration of the two agenda items relating to outer space during the twenty-ninth session of the

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General Assembly, and carried out other administrative and liaison functions required in the implementation of the decisions of the General Assembly and the Committee on the Peaceful Uses of Outer Space.

31. In the implementation of the United Nations programme on space applications, members of the Division assisted the Expert on space applications in organizing three panel meetings and seminars.

32. The first panel, held in Japan in February/March 1974 at the invitation of the Government of that country, dealt with satellite broadcasting systems for education. The panel, held in co-operation with UNESCO, was designed to provide an opportunity to discuss satellite broadcasting systems and educational broadcasting in general and to share the knowledge and experience of countries utilizing educational broadcasting. It was attended by 71 participants, including nine representatives of the United Nations system and other international organizations. The Government of Japan provided full financial assistance to participants from developing countries. The report of this panel was issued as document A/AC.105/128.

33. The second meeting was a joint United Nations/FAO regional seminar on remote sensing of earth resources and environment, held in September 1974 in Cairo, hosted by the Arab Republic of Egypt in co-operation with the National Science Foundation of the United States and Oklahoma State University. The purpose of the seminar, which was conducted as a step towards international effort in disseminating information on practical applications of remote sensing techniques, was to discuss the basic principles and applications of remote sensing techniques, from aircraft and from satellites and to evaluate the significance of satellite remote sensing technology in the exploitation of natural resources for national development. It was attended by 47 participants from 26 developing countries as well as seven participants from the United Nations system and international societies and organizations. About 50 participants from the host country were also present and 17 experts in remote sensing and its applications were invited by the United Nations, FAO and the host country from Brazil, Canada, Egypt, France, Italy, the United Kingdom and the United States. Funds allocated by the United Nations and FAO were utilized to provide financial support to 32 participants from the developing countries attending the seminar. The report of this seminar was issued as document A/AC.105/136.

34. The third meeting was a United Nations interregional seminar on the applications of geodetic and remote sensing data from satellites for cartography (surveying and mapping), held in November 1974 at São José dos Campos (Brazil). Its purpose was to share knowledge and experience and to discuss international co-operation in this field. It was attended by 78 participants from 19 developing countries, representatives of the United Nations Secretariat, the International Development Research Centre (IDRC) of Canada, the Inter-American Geodetic Survey and the European Space Research Organization (ESRO). The seminar also benefited from presentations by specialists from Australia, Canada, France, Germany (Federal Republic of), Switzerland, the Union of Soviet Socialist Republics and the United States of America. Funds allocated by the United Nations and by the IDRC were

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utilized to provide financial assistance to 19 participants from developing countries, and the funds for local arrangements were provided by the host country. The report of this seminar was issued as document A/AC.105/141.

35. In further implementation of the United Nations programme the Expert on space applications met with government officials in a number of developing countries to discuss various existing programmes and plans in the field of international co-operation in the practical applications of space technology and the various possibilities being opened up by this new technology to development. The Division also continued to assist in the administration of fellowship in the practical applications of space technology offered by Member States.

36. Close co-operation and co-ordination of activities were continued with the specialized agencies concerned, particularly in the implementation of the United Nations programme on space applications as evidenced by the joint meetings organized in this field by the United Nations and several specialized agencies. The Division has also continued participation in the Administrative Committee on Co-ordination (ACC) Ad Hoc Working Group on Practical Applications, which met in March 1975 in Geneva to review the areas of activity of the United Nations and the specialized agencies in this field.

37. The Chief of the Outer Space Affairs Division, Mr. A. H. Abdel-Ghani of Egypt left the Division in July 1974 to return to his Government and was replaced by Mr. Lubos Perek of Czechoslovakia in February 1975.

Centre for Natural Resources, Energy and Transport

38. The Minerals Section of this Centre made increased use of high-platform imagery during 1974 in its search for mineral resources through UNDP-funded technical assistance projects in various areas of the world.

39. The ERTS project in Bolivia was officially implemented in June 1974 and will continue to December 1975. Very good progress can be reported. Basic data for the planned development of natural resources is being gathered in the areas of geology, basic cartography, hydrogeology, agriculture, silviculture, land use, etc.

40. Other examples of the use being made of space imagery are: the search for diamonds in Lesotho, base metal exploration and geological mapping in Burma, general mineral exploration, geothermal energy exploration and geological mapping in Ethiopia, mineral exploration and geological mapping in Haiti. Valuable information was gathered during the period. Fellowships were also provided in specialized imagery identification courses.

41. The first United Nations Interregional Seminar on the Applications of Geodetic and Remote Sensing Data from Satellites for Cartography (Surveying and Mapping) in co-operation with the experts on outer space applications and the Cartography Section of the Centre for Natural Resources, Energy and Transport took place from 4-14 November 1974 at São José dos Campos, Brazil.

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42. The following are the important recommendations of the meeting:

(a) Nations sponsoring geodetic satellite programmes in return for access to site locations should train local personnel in the operation of tracking station-instrumentation, and assist in the development of local capability in satellite geodesy;

(b) The United Nations through its conferences and other meetings should continue to serve as the forum for the dissemination of all information on satellite geodesy and the establishment of a world geodetic datum;

(c) Training courses and seminars in the use of remote sensing data should be expanded, preferably with the assistance of the United Nations;

(d) Future seminars should be run on the lines of specific application by subject, rather than on the original application of satellite data. It was also suggested that interregional seminars should, if possible, be conducted in countries where at least some of the techniques under discussion, are being used; and

(e) Seminars on specific application of satellite data should be held at least once every two years.

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II. SPECIALIZED AGENCIES

A. International Telecommunication Union (ITU)

The following text brings up to date those paragraphs of the Review (paras. 165-299) and its addenda that relate to ITU.

After paragraph 234: insert

Decisions of the World Administrative Radio Conference for Maritime Mobile Telecommunications (Geneva, 1974)

As far as regulations are concerned, the main activities of the ITU in 1974 were in connexion with the World Administrative Radio Conference for Maritime Mobile Telecommunications.

The agenda of this Conference, mentioned below, expressly provided for the Maritime Mobile Satellite Service:

"To consider and revise as necessary the provisions of the Radio Regulations and the Additional Radio Regulations for the Maritime Mobile and the Maritime Mobile-Satellite Services and for the Radiodetermination and Radiodetermination-Satellite Services used for maritime purposes, provided that frequency spectrum considerations be confined to those parts of the frequency spectrum already available for these services".

It envisaged in particular the establishment of provisions relating to very high frequencies, especially the use of satellite systems for safety and distress purposes on certain channels and the regulations applicable to the operation, technique and frequencies of the maritime mobile-satellite and radiodetermination-satellite services.

The Conference was held in Geneva from 22 April to 8 June 1974. It was attended by some 500 delegates from 104 countries Members of the Union, who examined about 2,200 proposals for revision of the Regulations, a large number of which related to problems posed by the maritime mobile-satellite service.

It was generally recognized that administrations had little or no experience in operating a maritime mobile-satellite service and that consequently it was not possible at present to establish comprehensive regulatory provisions for such a service. Nevertheless, as temporary administrative, technical and operational provisions might be needed before the next competent world administrative radio conference, the Conference adopted a number of provisions to enable a maritime mobile-satellite service to be introduced in an orderly manner.

These provisions in fact led to the amendment of a substantial part of the prescriptions of the Radio Regulations relating to the maritime mobile service, such as definitions, operational procedures, accounting and staff of the stations, and the operators of the mobile earth stations of the maritime mobile-satellite service were taken into consideration.

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Among the recommendations adopted by the Conference, mention should be made of Recommendation No. Mar2-15 relating to temporary provisions covering the technical and operational aspects of the maritime mobile-satellite service; this recommendation stipulates that, whilst gaining experience to provide a basis for the adoption of detailed regulations by the next appropriate Administrative Radio Conference, administrations participating in the maritime mobile-satellite service should agree on temporary administrative, technical and operational provisions, notify them to the Secretary-General, and invite other administrations to adopt them without future commitment.

One of the resolutions adopted by the Conference, No. Mar2-17, relates to the establishment of a Manual for use by the maritime mobile and maritime mobile-satellite services; this resolution stipulates that those provisions of the Radio Regulations and Additional Radio Regulations, of the Telegraph Regulations and Telephone Regulations, of the International Telecommunication Convention and of the Recommendations of the Vth Plenary Assembly of the CCITT which are applicable or useful to stations in the maritime mobile and maritime mobile-satellite services should be assembled by the Secretary-General for inclusion in a revision of the manual entitled "Manual for Use by the Maritime Mobile Service".

In paragraph 236: delete

(ii) and (iii)

insert

- (ii) to effect, in the same conditions and for the same purpose, an orderly recording of the positions assigned by countries to geostationary satellites;
- (iii) to furnish advice to members with a view to the operation of the maximum practicable number of radio channels in those portions of the spectrum where harmful interference may occur, and with a view to the equitable, effective and economical use of the geostationary satellite orbit;
- (iv) to perform any additional duties, concerned with the assignment and utilization of frequencies and with the utilization of the geostationary satellite orbit, in accordance with the procedures provided for in the Radio Regulations, and as prescribed by a competent conference of the Union, or by the Administrative Council with the consent of a majority of the members of the Union, in preparation for or in pursuance of the decisions of such a conference.

After paragraph 237: insert

During 1974, the I.F.R.B. received from administrations information relating to 23 planned satellite systems; 19 of them were published in special section SPA-AA

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of the I.F.R.B. circular. The information published, which includes descriptions of the planned satellite systems, was submitted by the administrations of:

- the United States;
- additional information concerning the Marisat-Atlantic and Marisat-Pacific satellite networks, the characteristics of which were published in 1973;
- 11 networks of the national satellite system known as USASAT (1A, 1B, 2A, 2B, 3A, 3B, 4A, 4B, 5A, 5B and 5C);
- the ERSOS (Earth Resources Survey Operational System) satellite network, designed for research into the characteristics of the earth and related natural phenomena;
- the Helios - B satellite network, a scientific station launched in solar orbit, the second in the Helios series;
- France, the Marots satellite network for routing communications in the Maritime Mobile Satellite Service;
- Japan, the CSE, ETSI (Engineering Test Satellite-1) and SRATS (Solar Radiation and Thermospheric Structure Satellite) satellite networks intended for observations and experimental research.

In accordance with the provisions of paragraph 3.1 of Section B of Resolution No. Spa2-3 of the World Administrative Radio Conference for Space Telecommunications (Geneva, 1971), the I.F.R.B. also published information submitted by the Administration of Japan concerning the BSE system, intended for basic technical experiments in connexion with the Broadcasting Satellite Service.

In 1974 the I.F.R.B. received and dealt with 1,094 frequency assignment notices for stations in the space radiocommunication services. These notices concerned mainly the establishment or modification of space systems and the implementation of experimental programmes. Through its weekly circular the I.F.R.B. regularly transmitted to administrations the detailed information contained in the notices received, together with the relevant findings by the I.F.R.B. reached in accordance with article 9A of the Radio Regulations (Geneva, 1971).

In the "List of space radiocommunication stations and radio astronomy stations", which is prepared by the I.F.R.B., the ITU published the characteristics of earth stations and space stations recorded in the Master International Frequency Register. The second supplement to the fourth edition of this List was published in 1974.

The I.F.R.B. continued to formulate its Rules of Procedure and Technical Standards in accordance with the relevant provisions of the Radio Regulations as revised by the World Administrative Radio Conference for Space Telecommunications (Geneva, 1971).

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After paragraph 254: insert

The CCIR held its XIIIth Plenary Assembly in July 1974, at which numerous recommendations and reports concerning space radiocommunications were adopted and which, therefore, are available to the Space Broadcasting Conference scheduled to be held in the early part of 1977.

At the same time, that Plenary Assembly approved a number of questions and study programmes on the subject, thus assuring the continuation of CCIR work in this field. Thus it is expected that supplementary information will be available to the Conference, following the CCIR interim Study Group meetings scheduled for 1976.

Details on the activities of the CCIR follow, in accordance with its Study Group structure.

Study Group 2 - Space Research and Radioastronomy

During 1974, notable progress was made in three domains, relating to meaningful definitions of interference, the development of satellite technology for location of earth stations and for data collection, and in the analysis of safety aspects of radio-frequency radiation from space research earth stations. In addition, quantitative appraisals of the effects of interference on many aspects of space research and radioastronomy are now to be seen in texts put forward by the Study Group. The space disciplines represented in Study Group 2 are now so numerous that results achieved within the Study Group can be seen to have importance for such service Study Groups as 4, 8, 10 and 11, which are also concerned with satellite technology. For this reason, Study Group 2 is endeavouring to present its work in such a way as to facilitate its general use.

Study Group 4 - (Fixed service using communication satellites)

As the Study Group held its final meeting in early 1974, the conclusions of that meeting were submitted to the XIIIth Plenary Assembly and, with the exception of one recommendation on station keeping of geostationary satellites in orbit, all texts were adopted unanimously.

The directives of the World Administrative Radio Conference on Space Telecommunications held in June 1971 served as guidelines for many new studies, the most important of which concerned the use of frequencies above 10 GHz. Since these higher frequencies are also to be used for terrestrial radio-relay systems, co-ordination and interference problems between the two systems have to be envisaged and these figure prominently, therefore, on the programmes of the Study Groups concerned.

Furthermore, the use of these higher frequency bands for systems in the fixed satellite service requires the revision and extension of many previous conclusions which are only applicable to frequency bands below 10 GHz. While the high

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absorption of electromagnetic energy by rain and clouds makes these frequencies unsuitable for long-distance transmissions, the much wider bandwidths available at these higher frequencies offer new possibilities. In consequence, digital transmission, which is more resistant to interference and noise is being introduced and studies with regard to its characteristics and parameters are being pursued at an accelerated pace.

Parallel to the problems of the congestion of the radio frequency spectrum, the efficiency of the use of the geostationary satellite orbit is also becoming pressing, with the gradual increase in the number of geostationary satellites. The collective traffic handling capacity of a number of geostationary satellites involves an extremely intricate relationship between size, number and orbital positions of each satellite on the one hand and the assignment of frequencies to the individual satellites on the other. To resolve these problems, Interim Working Party (IWP) 4/1 was formed in 1968. In addition to the studies referred to in the 1974 report, the IWP is actively considering the use of satellite to satellite relay systems to compensate for the unequal distribution of satellites in the geostationary orbit. Frequencies for such relays can be very high, because there are no clouds or rain to cause attenuation and antennae of very high gain can easily be constructed. However, studies need to be made to evaluate the consequences of the increased delays due to the large distances involved.

The IWP met during the final meeting of Study Group 4 in 1974 to finalize its proposals to the Study Group.

At the final meeting of Study Group 4 itself, more than 200 new contributions were submitted by participants. As a result of this continued interest in the work of the Study Group, all but five existing texts were updated or completely revised, 10 were deleted and 24 new texts were adopted.

The progress made during 1974 may be briefly summarized as follows:

1. On the calculation of the co-ordination distance and assessment of interference probabilities, minor revisions were made of the texts adopted by the WARC-ST, which were based on the results obtained at the Special Joint Meeting of CCIR Study Groups held in 1971. These departed quite substantially from those adopted at the previous CCIR Plenary Assemblies. However, due to lack of time, the latest tropospheric propagation data provided by Study Group 5 were not taken fully into account, but it is anticipated that this will be done in the near future.

2. On methods of modulation and multiple access, Study Group 4 revised two reports, taking into account the advent of digital transmission techniques. This development in space telecommunication is somewhat analogous to that in radio-relay systems and due primarily to the use of higher frequency bands hitherto considered not feasible for frequency division multiplex systems. Furthermore, radiocommunication systems using satellites operating in the time-division multiple access mode present very great economic advantages over the traditional frequency division multiplex mode for sparsely populated regions of the world.

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Naturally, the occupation of the radio frequency spectrum, special coding methods, error rates, energy dispersal, speech interpolation techniques, etc., have to be examined in detail with the objective of improving the utilization of the radio frequency spectrum. Furthermore, digital modulation introduces a further delay due to coding and filtering. This has to be added to the transmission delay due to finite propagation time of electromagnetic waves.

3. As communication satellite systems enter into their second decade of commercial operation, earth station maintenance procedures need to be standardized, so that measurements made of such quantities as noise in the base band can be specified in terms of performance quality. Following the example of radio-relay systems, Study Group 4 has also appointed a rapporteur to present its views to Special Joint CCITT/CCIR Study Group C on reliability problems.

4. The improvement in the construction of satellites has also made possible the use of new types of antennae. With these, by the use of cross-polarization, multiple frequency excitation, or spot beams, the same frequencies can be repeatedly used by the same satellite. This naturally has repercussions in the efficient use of both the radio frequency spectrum and the geostationary satellite orbit. They are to be studied by Study Group 4.

5. Study Group 4 adopted a report on sharing criteria, in response to the decision of the WARC-ST that the frequency band 14.0-14.4 GHz should be shared between the fixed satellite service and the radio navigation service. It also adopted a report on the use of the up-path (from earth to space) of the broadcasting satellite service in the band limited to the fixed satellite service. Finally, a new Study Programme was adopted, giving guidelines on future work on the use by the maritime mobile service of the same frequencies for up-path communications.

6. Study Group 4 also adopted a report, in response to a recommendation by WARC-ST, requesting the CCIR to study parameters of transportable earth stations for relief operation, while it adopted in addition a new question describing studies for low-capacity earth stations and associated satellite systems, in response to a resolution of the Plenipotentiary Conference (Torremolinos, 1973). These studies are of special interest to developing countries.

To sum up, it is evident that the studies entrusted to Study Group 4 are expanding with the development of space techniques and now cover many aspects which were not anticipated some 10 years ago.

Study Group 5 - Propagation in non-ionized media

As before, only those activities relating to the peaceful uses of outer space will be mentioned; it will be understood that this Study Group has very wide coverage.

Propagation as a parameter of space services concerns mainly the effects of

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the presence of the earth and its atmosphere; beyond this limited region propagation characteristics are both stable and readily predicted. The problems of frequency sharing that have become so important to the space services are therefore closely associated with the effects of propagation of radio energy through the troposphere in general terms.

One of the principal fields of investigation at the present time is that of the continuous evolution of a realistic but at the same time reasonably simple propagation model for the calculation of co-ordination distances. Co-ordination distance is a concept necessary for the estimation of probable interference effects due to the establishment of a given earth station, so that an abstract may be arrived at in a very early planning stage. Study Group 5 is at present refining and simplifying the existing propagation model used in this regard, the basic problem being that, as the terrain cannot be precisely known except in the region of the proposed site of the earth station, meaningful propagation data must nevertheless be available. The accuracy of the solutions reached in such calculations is of vital importance to all space services. Interim Working Party 5/2 is specializing in this field and work during 1974 is expected to culminate in a meeting of the IWP early in 1975 to consider the results.

Other activities in the Study Group include investigation of tropospheric propagation over a very extended frequency range, of which the upper limit is now rather more than 300 GHz. These investigations naturally are of importance to all space services, and include the subject of frequencies that are unsuitable for tropospheric propagation because of high absorption for example; such frequencies have an obvious application in satellite-satellite links that are not liable to suffer interference from sources on the earth.

Other activities under continuous study include propagation factors relative to the siting of earth stations and the reception of radio signals on the moon.

Study Group 8 - mobile services

At its final meeting in 1974 Study Group 8 revised most of the existing reports and prepared a great number of new reports on the use of space techniques for the maritime and aeronautical mobile satellite service. Among the new reports the following important subjects are treated:

Noise as a factor affecting the choice of frequency for communication between an aircraft/ship and a satellite;

Antennae for aircraft and ships;

Operational aspects for both services;

A theoretical comparison of voice communication techniques.

Several texts of importance dealing only with the maritime aspect are due to

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the fact that the preparations for maritime satellite systems have been advancing rapidly, both at national and international levels. Reports on the following subjects were drafted:

Factors affecting the planning and designing of a satellite system for the maritime mobile satellite service;

Consideration of possible technical characteristics for a maritime satellite system for public correspondence;

Possible maritime distress systems using satellites.

Several important technical characteristics for systems in the maritime mobile satellite service still need considerable study. In order to progress more rapidly with these studies, an Interim Working Party (IWP 8/1) was set up by Study Group 8. It is hoped that a good progress report will be available at the next Interim Meeting of Study Group 8 and that the work will be completed for the XIVth Plenary Assembly of the CCIR.

All texts of Study Group 8 were unanimously approved by the XIIIth Plenary Assembly. All relevant texts were taken into consideration by the Panel of Experts on Maritime Satellites of the Inter-Governmental Maritime Consultative Organization (IMCO) in the preparation of the part of its final report dealing with the over-all basic technical parameters of a first-phase satellite system.

Study Groups 10 and 11 - Broadcasting service (sound and television)

Following upon the work done at the Interim and Final Meetings of these Study Groups, the XIIIth Plenary Assembly adopted an important series of reports dealing with many aspects of satellite-broadcasting. These texts will form a very good basis on which further planning can be done in the preparation of this service and it is of great importance to record that such bases have been established before the service itself has been put into operation, thus hopefully avoiding future problems caused by multiple standards.

The problem of producing, at an acceptable price, an adapter to be connected to a commercial television receiver to enable direct reception of broadcasting signals from a satellite has not yet been resolved, although certain indications have been received that the problem is not far from solution and that in a reasonably short time such adapters will be available at a price that will permit their mass-production and utilization in those countries desiring to operate a broadcasting-satellite service.

Work is also proceeding within the CCIR on the possibilities of using frequencies of about 12 GHz for television broadcasting purposes and these studies may well have a useful repercussion on the development of the broadcasting-satellite service.

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CMTT - CCIR/CCITT Joint Study Group on Transmission of
Sound Broadcasting

A new development which promises to be of great interest to the use of broadcasting-satellites is that of the introduction of digital methods of modulation, both for the initial video or sound signal derived from the studio and for the modulation of the radio-frequency carrier of the emission. Work is actively under way within several Administrations and co-operation between Study Groups 4, 9, 10, 11 and the CMTT is assured by a new Interim Working Party, CMTT/1, under the chairmanship of Mr. G. Simpson (United Kingdom), which will act as a co-ordinating and liaison body between the Study Groups of the CCIR and those of the CCITT which are interested in this problem. Close co-operation has also been set up with organizations outside the ITU, concerned specifically with the application of digital techniques to television broadcasting.

Interim Working Party PLEN/2 - Possible broadcasting-satellite
systems and their relative acceptability

Interim Working Party PLEN/2, which was established under resolution 38 at the XIIIth Plenary Assembly, New Delhi, 1970, with the task of examining, from the point of view of technical merit and economic feasibility different possible systems of satellite-broadcasting systems and their relative acceptability, has been very active during the period 1970-1974. At the XIIIth Plenary Assembly, a report by the IWP was presented by its Chairman, Mr. K. Basu (India), giving, in succinct form, a resumé of its activities and at the same time a comprehensive text was presented on all aspects of the subject under study. It was agreed that this text should be prepared as a report of the CCIR, to be published separately from the printed volumes and that this report should be presented to the proposed World Administrative Conference on Satellite-Broadcasting to be held in early 1977.

After paragraph 256: insert

The CCITT is studying the use of telecommunication satellites for telegraph, facsimile, telephone and data transmissions and, where necessary, the signalling associated with these various types of information. Numerous study groups are contributing to this work.

Data transmission services

The use of satellite circuits in data transmission has not been studied as a specific technique in isolation from other transmission techniques; nowadays, satellite techniques are regarded as complementary to the other traditional techniques, i.e. landline or submarine cable systems. For instance, in the hypothetical reference connexions which are the basis for the parameters and the network design of dedicated data networks, connexions with one or two satellite hops are included. The characteristics of satellite circuits and, in particular, the long propagation times they entail, pose, of course, certain problems with regard both to call set-up and clear-down time objectives and to error correction procedures.

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Another feature which is peculiar to SPADE* systems is the availability of only a 56 kbit/s stream in contrast to the standardized 64 kbit/s p.c.m. rate. Recent development in data applications takes account of these features of satellite circuits with a view to reconciling them with other CCITT standardized techniques.

Telegraphy

In telegraph applications, call set-up and clear-down time objectives are less stringent than for data networks and error correction methods for telex are not standardized by the CCITT.

Furthermore, telegraph transmission rates are derived from a submultiplex bearer defined by Study Group VII so that the above-mentioned problem of 56 kbit/s versus 64 kbit/s does not concern the telegraph study groups directly.

On the other hand, a new question on the use of satellites for the provision of fully or semi-automatic telegraph services to and from ships has been adopted by the members of the ITU. The study of this question will be undertaken in close co-operation with the Inter-Governmental Maritime Consultative Organization (IMCO) and the shipping industry. The aim of this study will be the full integration of these new services in the existing public telegraph services.

Telephone transmission

Study Group XII (Telephone transmission quality and local networks) is investigating ways of improving the quality of communications, such as satellite communications, with very long propagation times, especially by the use of adaptive echo cancellers. Some test results were submitted to its 1974 meeting but they have not yet made it possible to draw any general conclusions on the subject.

Study Group XVI (Telephone circuits) studied the transmission characteristics of telephone circuits established on SPADE satellite systems which, by definition, work on a demand assignment basis. It has formulated some preliminary remarks on transmission parameters for a maritime satellite telephone communication system.

Telephone switching

The studies carried out by Study Groups XI (Telephone switching and signalling) and XIII (Automatic and semi-automatic telephone networks), both of which held meetings in 1974, concern:

The effect of the propagation time of satellite circuits on the use of the signalling systems standardized by the CCITT. At the present time, the only two international systems compatible with the operation of satellite

* SPADE: Single channel per carrier PCM multiple access demand assignment equipment.

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circuits are systems Nos. 5 and 6. There is keen interest (especially among African countries which will be using the R.2 system as the basic system for intra-African links) in the studies and tests, which were actively pursued in 1974, to see how and with what possible adjustments this regional system could be used for signalling on satellite circuits.

The parameters to be defined (in particular those relating to inclusion in the World Numbering Plan) for the study of maritime telephone communication systems via satellite which should be integrated in the general telephone network and permit automatic or semi-automatic operation.

The studies on these basic parameters have led to close technical collaboration of the CCITT, through its secretariat, with IMCO in the latter's work on the establishment of an international maritime satellite service.

Automatic telephone access to ships at sea

The World Administrative Maritime Radio Conference in June 1974 invited the CCITT to define suitable procedures for a modern international rate-fixing and accounting system for telegraph, telex and telephone communications with ships at sea. The study, which will be carried out within Study Groups I and II (dealing respectively with telegraph operation and tariffs and telephone operation and tariffs) by a Joint Maritime Radio Services Working Party, will have to take account of the technical constraints imposed by a world numbering plan for automatic and semi-automatic access to ships at sea. The conditions of operation of a system of this type, using satellites, for the maritime mobile service were brought out by CCITT Study Group XIII at a meeting in October 1974 and will provide a valuable basis for the work of the above-mentioned Joint Study Group I/II, which is to hold its first meeting in January 1975.

After paragraph 268: insert

The World Plan Committee and the four Regional Plan Committees (Africa, Latin America, Asia and Oceania, and Europe and the Mediterranean Basin) - which are joint CCITT/CCIR Committees administered by the CCITT - are responsible for developing a general plan for the international telecommunication network to facilitate the co-ordinated development of international telecommunication services.

For this purpose they have to keep up to date, by region, the list of earth stations, existing or planned, for satellite links. This information is published in the Plan Books.

The Regional Plan Committee for Europe and the Mediterranean Basin and the corresponding Committee for Asia and Oceania met in 1974; they reviewed the latest Plan data and gave directives for future work. The Africa Plan Co-ordination Committee also met in 1974 to draw up a questionnaire for the 1975 Plan for the region.

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After paragraph 273: insert

Assignment of space communication experts

Following requests from Jordan and the Sudan, the services of space communication experts were made available to each of these countries.

Briefing of interested officials on the technical and economic trade-offs in earth station planning

Taking advantage of the presence of senior officials from administrations, who were in Geneva for other purposes, several meetings were held on the planning and the economics of operation of earth stations. These meetings were held with officials from Upper Volta and from Cyprus.

Assistance to the Administration of Saudi Arabia in negotiations with manufacturers for the establishment of two standard earth stations in the kingdom

An inspection team of two ITU officials visited the manufacturer of the earth station equipment to assist in the selection of equipment for the two standard earth stations. The technical advice given concerned all systems and subsystems of the two stations.

Assistance to the Administration of Saudi Arabia in the performance of acceptance tests on two non-standard earth stations

Two ITU officials assisted the Administration to perform acceptance tests on two non-standard stations installed to operate until the standard earth stations are completed.

After paragraph 275: insert

Participation in the National Seminar on the Use of a domestic satellite communication system, Jakarta, Indonesia

The Technical Co-operation Department of the ITU participated in the Indonesia National Seminar on the use of a domestic satellite communication system (held in Jakarta from 9 to 12 September 1974) by giving a paper on the techno-economic and management organizational factors to be considered in planning a domestic satellite system.

It is expected that the Indonesian domestic satellite system will be operational by 1976 and that the ITU Technical Co-operation Department will be active in assisting the Government in the formidable training programme required in conjunction with this project.

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After paragraph 283: insert

Progress in the ITU's activities in India with regard to the UNDP/ITU project in preparation for the satellite instructional television experiment (SITE)

The ITU, as an executing agency for the UNDP-financed project designated IND/70/609 (Expansion of the ESCES earth station), has almost completed the provision of all inputs for which it is responsible in preparation for the SITE. The experiment is scheduled to start in July 1975. In the main, the development and fabrication work on the subsystems at the earth station has been completed through a subcontract issued to Hughes Aircraft Co., of the United States of America, under the over-all supervision of the ITU Co-ordinator at Ahmedabad. The station is ready for final system integration testing which will be completed by February 1975. Likewise, through another subcontract issued to the British Aircraft Corp., England, substantial progress has been achieved in assisting the Indian authorities to conduct reliability tests on components and television receivers.

The ITU has also undertaken to assist the Indian authorities in providing facilities for the production of instructional programmes and a low-power rediffusion television transmitter as a part of the SITE programme. Following the publication of an international request for tenders, orders for the principal equipment for these two installations were placed with NEC Japan, while further orders for ancillary or specialized equipment were placed with other companies. Some equipment has been delivered and the rest is expected to be delivered by January 1975. The television transmitter installation is scheduled to be completed by January 1975 and the studio by March 1975.

A mid-term review of the UNDP/ITU inputs, undertaken jointly by the ITU and the UNDP in August-September 1974, resulted in UNDP approval of an increased allocation of about \$440,000 to the project to cover certain vital gaps in equipment and expert assistance, bringing the total UNDP input to \$1,511,934.

In general, the progress of activities, both on the side of India and of the ITU, has been significant since January 1974. The status of the experimental satellite communication earth station (ESCES), improvement in hardware quality, progress in village selection, fabrication of television sets and front-end converters, organization of village cluster centres, evaluation teams and deployment plans have all been appraised as satisfactory.

After paragraph 285: insert

As indicated last year, a report on a technical and economic study of satellite broadcasting services in Latin America is being prepared by the ITU and will be integrated within the report by UNESCO on the complete feasibility study on educational television. Work continued on this report during 1974 and account was taken of the comments submitted by the participating countries. The report will be ready for distribution in 1975.

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The ITU, as an executing agency for the UNDP-financed project "Feasibility study/preinvestment survey for the Middle East telecommunication network", has undertaken preliminary studies of the traffic and transmission requirements in the Arab League and neighbouring countries. Traffic data has been collected and analysed with the aid of a computer. Case studies were made for the use of a terrestrial network only, as well as a combined terrestrial and satellite network, and a preliminary network master plan has been prepared and discussed with the participating administrations.

A final master plan proposal for a combined terrestrial and satellite regional network will be presented in May 1975. This master plan will include the transmission requirements for telephone, telegraph, sound and video broadcasting services.

After paragraph 287: insert

System development of an air-transportable earth station for use in cases of natural disaster and United Nations peace-keeping requirements

The ITU continued to collaborate with the United Nations in the development and testing of an air-transportable earth station. The requirements for a space telecommunication system and its application during peace-keeping activities have been examined. A plan of action was devised to test such a system during 1975 and 1976 in collaboration with other agencies and using equipment placed at our disposal for the purpose of these tests.

Paragraph 295: amend the subparagraphs indicated as follows:

- (1) International Telecommunication Convention, Malaga-Torremolinos, 1973
insert a new subparagraph after (6)
- (6a) Final Acts of the World Maritime Administrative Radio Conference, Geneva, 1974
- (8) Documents of the XIIIth Plenary Assembly of the CCIR, Geneva, 1974
Volume II - Space research and radioastronomy
Volume IV - Fixed-satellite service
Volume VIII - Mobile services
Volume IX - Fixed service using radio-relay systems. Co-ordination and frequency sharing between systems in the fixed-satellite service and the terrestrial service using radio-relay systems
Volume XI - Broadcasting (television) including satellite applications
- (13) General plan for the development of the regional Asian and Oceanian network
- (18) Replace the sentence in brackets by the following: (The thirteenth report, dealing with 1973, has appeared; the fourteenth, dealing with 1974, will appear in mid-1975).

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After paragraph 296: insert

(c) Preparation of handbooks

In December 1972, at the suggestion of the Regional Plan Committee for Asia and Oceania, the Vth Plenary Assembly of the CCITT instructed Special Autonomous Working Party (GAS) 3 to prepare texts on national and regional satellite telecommunications for inclusion in the handbook on "Economic and technical aspects of the choice of transmission systems".

The Editorial Committee of GAS 3 has started preparing draft texts on this subject for submission to the GAS 3 meeting in July 1975.

After paragraph 299: insert

In 1974 the General Secretariat continued its activities in pursuance of Administrative Council resolutions Nos. 636 and 637 concerning the spreading of information on the activities and role of the ITU in space telecommunications.

The Telecommunication Journal continued to publish a monthly list of satellites launched, articles on space matters and, at regular intervals, statistics on the utilization of telecommunication satellites.

In April 1974 the Journal published as a supplement the list of satellites launched in 1973 and in July, also as a supplement, the Thirteenth Report by the ITU on telecommunication and the peaceful uses of outer space.

As in previous years, the Union's film library lent out many films dealing with space telecommunications.

At the end of 1974 preparations began for the fourth symposium on "Space and radiocommunications" which is to be held on 6 June 1975, in association with the thirty-first International Air and Space Show in Paris - Le Bourget. This symposium will take place under the patronage of the French Secretary of State for Posts and Telecommunications and will deal with the telecommunication aspects of "Satellites in Aeronautics".

B. World Meteorological Organization (WMO)

The following text has been submitted to bring up to date the section of the Review on WMO (paras. 300-355).

In 1974 both near-polar orbiting and geostationary satellites continued to play important roles in the daily operations. The synchronous meteorological satellite (SMS)-1, developed by the United States of America, the prototype of the geostationary operational meteorological satellite (GOES), was launched on 17 May 1974 and was positioned over the equator at about 45°W to provide continuous

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visible and infrared imaging, data collection and relay capability for the GARP 1/ Atlantic tropical experiment (GATE). After the successful completion of GATE the SMS-1 was moved to about 75°W to provide routine operational service.

With regard to the polar orbiting satellites of the World Weather Watch, the United States launched NOAA-4 to provide images in the visible and infrared, and information on the vertical distribution of temperature and moisture, all in a direct broadcast and recorded mode. During the same period, the Union of Soviet Socialist Republics, also launched a METEOR satellite with direct broadcast capability for transmitting automatic picture transmission (APT) type images.

The highlight of the satellite-related activities within WMO was the convening of the first session of the Executive Committee Panel of Experts on Meteorological Satellites in May 1974. The role of the panel is to co-ordinate the programmes of various satellite activities within WMO, and provide a forum for the satellite launching members and satellite user members, so that maximum benefits may be derived from the satellite information. One of the important recommendations of the panel was that WMO should prepare and distribute to all members a series of publications describing the national programmes of the satellite operating members, a guide on direct broadcast systems, and technical notes describing various uses of satellite data. Action on these items has since been initiated in WMO.

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

The following text has been submitted to bring up to date the section of the Review concerning UNESCO (paras. 356-388).

1. Assistance to member States

The draft report on the feasibility study of a regional system of tele-education for the countries of South America was discussed in January 1974 at a meeting in Caracas, attended by representatives of national tele-education committees of the participating countries. To conform with the views expressed by the group, substantial revisions have been undertaken and the final report will be issued in 1975.

Consultations have continued with the Arab States Broadcasting Union, through UNESCO's communication adviser in the region, in connexion with the development of an Arab regional satellite system.

Under the auspices of the National Commission for UNESCO in Indonesia and co-operating ministries, a seminar was held in Jakarta in September on plans for a domestic satellite system. UNESCO representatives attended the seminar and UNESCO also funded the participation of a number of international experts in space communication including one from the ITU.

1/ Global Atmospheric Research Programme.

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The planned Indonesian satellite system envisages, in addition to telecommunication facilities, two channels for distribution of television programmes, one of which will be devoted to education. In preparation for this, and at the request of the Indonesian authorities, a preliminary UNESCO mission prepared a detailed project for a pre-investment study to assist the Ministry of Education and Culture to adopt the most effective strategy for introducing educational technology.

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. 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 experiment scheduled for 1975. Trainees have already been assigned to the satellite experiment.

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.

2. Research and training

Through funds-in-trust provided by the Ford Foundation, UNESCO is executing in India a project designed to do research on audience needs and responses and to prepare pilot television programmes, which will be particularly relevant for satellite transmissions. Within this context, an experimental project on the design of television programmes which can be used for audiences with different cultural and linguistic backgrounds has been foreseen.

In preparation for the project, a study presenting a synthesis of major research findings on cross-cultural broadcasting throughout the world was commissioned. The problem is being studied from the linguistic, cultural, psychological and political points of view.

UNESCO-sponsored post-graduate courses in integrated studies and rational management of environmental resources for specialists from developing countries in the Netherlands, France and the United Kingdom continue to devote a part of their training programmes to the study of the principles of remote sensing. The use of remote sensing in integrated surveys was dealt with, among other topics, at the International Symposium on Integrated Surveys for Regional Development, organized in Bogotá (Colombia) in June 1975 by the International Institute for Aerial Survey and Earth Sciences (ITC)-UNESCO Centre for Integrated Surveys (Enschede, Netherlands) with UNESCO's financial assistance.

3. Copyright

An international conference of States on the distribution of programme-carrying signals transmitted by satellite was convened jointly by the Directors-

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General of UNESCO and the World Intellectual Property Organization (WIPO) at Brussels from 6 to 21 May, to conclude an international convention on the subject. The draft submitted to the Brussels Conference for consideration was the end result of the work of three Committees of Governmental Experts convened jointly by UNESCO and WIPO to study the various problems in the field of copyright and the protection of performers, producers of phonograms and broadcasting organizations raised by transmissions via space satellites. The work of the three Committees, which met in Lausanne (1971), Paris (1972) and Nairobi (1973) respectively, was inspired by an awareness that the use of satellites for the distribution of programme-carrying signals was rapidly growing both in volume and geographic coverage, and that there was no worldwide system to prevent any potential piracy of such signals. It was felt that if an international system were not established, originating broadcasting organizations would have no means of controlling the use made of their signals and thus would be forced to purchase in every case, with respect to the works incorporated in the programmes transmitted by satellite, rights for all the countries able to receive the satellite signal. It was recognized that the costs involved would most likely hamper the development of satellite communications.

At the close of its work, the Brussels Conference adopted the "Convention relating to the distribution of programme-carrying signals transmitted by satellite". Under this convention, which does not cover direct broadcasting by satellite, each contracting State undertakes to take adequate measures to prevent the distribution on or from its territory of any programme-carrying signal by any distributor for whom the signal is not intended.

4. Co-operation with other organizations

UNESCO collaborated with the United Nations in a Panel Meeting for the Asian region held in Tokyo from 26 February to 7 March 1974. This meeting was designed to provide an opportunity for participants to discuss satellite broadcasting systems for education and educational broadcasting in general.

UNESCO was represented at the combined session of the Working Group on Remote Sensing of the Earth by Satellites and the Task Force of the Working Group; at the 18th Plenary Meeting of COSPAR and the COSPAR/INEE Seminar on Space Applications of Direct Interest to Developing Countries; and at the United Nations Interregional Seminar on the Application of Geodetic and Remote Sensing Data from Satellites for Cartography.

A UNESCO representative participated in the International Satellite Conference organized by the United States Agency for International Development in Denver, Colorado (United States) from 3 to 10 May, which examined problems in planning and managing satellite experiments and inspected one of the reception sites for the Rocky Mountain experiment using ATS 6.

Consultations were held at the University of Hawaii concerning the present operations of the Pan Pacific Education and Communication Experiments by Satellite (PEACESAT) and on the future possibilities of a Pacific Satellite to link educational and public institutions in the Pacific Basin.

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UNESCO has been represented at the fifth session of the Working Group on Direct Broadcast Satellites of the Committee on the Peaceful Uses of Outer Space, held in Geneva in March, the eleventh session of the Scientific and Technical Sub-Committee of the Committee on the Peaceful Uses of Outer Space, held in New York in April, and the thirteenth session of the Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space, held in Geneva in May.

5. Publications and documentation

An annotated bibliography of United Nations publications and documents relevant to UNESCO's activities in the field of space communication 1947-74 was issued.

The Declaration of Guiding Principles on the Use of Satellite Broadcasting for the Free Flow of Information, the Spread of Education and Greater Cultural Exchange was published in brochure form and is available in English, French, Spanish, Russian and Arabic.

A study on the social and cultural impact of satellite-based television, prepared by Professor T. Martelanc of the School of Sociology, Political Science and Journalism, University of Ljubljana (Yugoslavia) was published in English.

F. International Civil Aviation Organization (ICAO)

The following text has been submitted to bring up to date the section of the Review on ICAO (paras. 415-433).

1. After paragraph 417: insert

ICAO now consists of 129 member States. Its Council consists of representatives of 30 States elected by the Assembly and the Air Navigation Commission consists of 15 technical experts elected by the Council from nominations which can be made by all contracting States.

2. After paragraph 421: insert

Based on preparatory work done by the ASTRA Panel, the Seventh Air Navigation Conference, held in Montreal from 5 to 28 April 1972, outlined a comprehensive programme for the development, evaluation and eventual operation of an aeronautical satellite system. In direct response to related recommendations of that meeting, a group of nine European States represented by the European Space Research Organization (ESRO), Canada and the United States signed a Memorandum of Understanding in 1974 outlining a development and evaluation programme to be financed by the participating States, and to be controlled by a body known as the Aerosat Council. Arrangements are being made to ensure close co-ordination between ICAO and this international Aerosat programme, and it is expected that the ASTRA Panel will be called upon to advise the Air Navigation Commission on technical matters in this regard.

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3. After paragraph 426: insert

The Aerosat programme mentioned in the insert following paragraph 421 is expected to be of great assistance in furthering the work outlined in paragraph 426.

4. After paragraph 427: insert

The development and evaluation Aerosat programme is expected to have two satellites in orbit by late 1979. Assuming a two to three year period of data gathering and evaluation, it could be possible to begin the task of preparing international standards and recommended practices (SARPs) towards the mid-1980s, and to have completed the task towards the end of the 1980s.

5. After paragraph 429: insert

The ASTRA Panel held its Fifth Meeting in Montreal, 10-21 January 1972, and prepared documentation for the Seventh Air Navigation Conference.

G. Inter-Governmental Maritime Consultative Organization (IMCO)

The following brings up to date the section of the Review concerning IMCO (paras. 434-442).

1. Following a decision by the eighth IMCO Assembly in 1973 to convene an International Conference on the Establishment of an International Maritime Satellite System, the Maritime Safety Committee at its thirty-first session agreed that the Conference should be held in London from 23 April to 9 May 1975.
2. The aim of the Conference would be "to decide on the principles of setting up an international Maritime Satellite System and if it accepts these principles, to conclude agreements to give effect to this decision".
3. The Panel of Experts on Maritime Satellites which was established in March 1972, held two sessions in 1974 and prepared a report for consideration by the Conference. The report includes the following sections:

- Section I - Reasons for establishing a maritime satellite system
- Section II -- Operational requirements of the system
- Section III - Sharing possibilities between the aeronautical mobile- and maritime mobile-satellite services
- Section IV - Over-all basic technical parameters of a first phase system
- Section V - Channel assignment and terrestrial interface

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Section VI - Economic assessment of the system

Section VII - Organizational and institutional arrangements for the establishment of the system

4. Section VII of the report dealing with organizational and institutional arrangements contains a number of alternative solutions regarding the form that the organizational arrangements for the establishment of an international maritime satellite system might take. It was generally recognized that there should be a policy-making body as the main component of these arrangements but that there are various possibilities concerning ownership and operation of the space segment.

5. The Maritime Safety Committee at its thirty-first session approved the report of the Panel of Experts on Maritime Satellites which was subsequently circulated to Governments and organizations invited to participate in the Conference.

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III. OTHER INTERGOVERNMENTAL ORGANIZATIONS

A. European Space Vehicle Launcher Development Organization (ELDO)

The following was submitted regarding the section of the Review concerning ELDO (paras. 460-502).

Following the abandonment of the Europa II and Europa III launcher programmes this Organization has no programme in progress. In 1974 the administrative and programme liquidation was pursued.

B. European Space Research Organization (ESRO)

The following text has been submitted to bring up to date the section of the Review on ESRO (paras. 503-550).

1. Activities and programmes

The aeronautical satellites programme (Aerosat) entered a decisive phase with the signature, first, of the Memorandum of Understanding between ESRO, the Federal Aviation Administration (FAA) of the United States and the Government of Canada, and, secondly, of the contractual arrangements covering the space segment between ESRO, the Cosmat General Corporation and the Government of Canada. Japan and Australia indicated their interest in this programme.

The meteorological satellite programme (Meteosat) continued to be the subject of consultation with the countries which are participating in the World Weather Watch (WWW) (United States, USSR and Japan) and which are also developing geostationary meteorological satellites.

The maritime satellite programme (Marots) was set, from the moment of its conception, in the context of the work being done by the Inter-Governmental Maritime Consultative Organization (IMCO). This satellite corresponds to the standards defined by IMCO. Norway (a non-member State) has joined the member States participating in this programme.

The Spacelab programme is going ahead in close co-operation with the National Aeronautics and Space Administration of the United States (NASA). Considerable thought has already been given to the use of the space laboratory. Austria (a non-member State) has acceded to the Spacelab programme.

The development of the Ariane launcher programme will enable Europe to acquire independence in space activities. The test flights (4) of the launcher, starting in 1979, will permit a certain number of scientific and technological experiments to be flown. Experimenters from all countries will be invited to propose experiments.

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The communications satellites programme (OTS - Orbital Test Satellite then ECS - European Communications Satellite) is another programme whose characteristics are likely to meet the requirements of countries with needs comparable with those of Europe in this area. From 1978 onwards, Europe will have an experimental and preoperational system for relaying television programmes and for routing telephone communications by satellite. Some of the techniques used in connexion with the OTS programme will be tried out on the Canadian satellite (CTS).

In co-operation with NASA and the Science Research Council of the United Kingdom, ESRO is participating in the international ultraviolet explorer (IUE) satellite programme. ESRO is also co-operating with NASA in the International Sun Earth Explorer (ISEE) programme.

Other scientific satellites are under development - COS-B, GEOS and, finally, Exosat.

ESRO has been following very closely the work of the United Nations Committee on the Peaceful Uses of Outer Space and has been represented as an observer at the meetings of that Committee as well as of both its Legal Sub-Committee and its Scientific and Technical Sub-Committee. ESRO was also present as an observer at various meetings of the ITU and IMCO.

Two subjects dealt with by the Committee on the Peaceful Uses of Outer Space have been of particular interest to ESRO, namely, direct broadcasting by satellite and the remote sensing of earth resources by satellite. ESRO itself is engaged on work in these two areas, i.e. use of the OTS platform for developing a direct broadcasting satellite and the definition of an original European programme for remote sensing of earth resources by satellite.

2. Preparations for the European space agency

The European Space Conference of European ministers responsible for research confirmed in July 1973 its decision of December 1972 to set up a single European space organization, formed out of ESRO and ELDO and called "The European Space Agency". This agency would take over the rights and obligations of the two existing European space organizations but would have a broader based mission than the latter. It would begin to function de facto as from April 1974, when ESRO would adopt the name of European Space Agency. A draft convention was drawn up, but because of certain divergences existing the conference of plenipotentiaries responsible for approving the draft convention could not be called in 1974.

C. International Telecommunications Satellite Organization (INTELSAT)

The following is submitted to bring up to date the section of the Review on INTELSAT (paras. 551-572).

The International Telecommunications Satellite Organization (Intelsat), created in 1964 to effect the establishment of a global communications satellite system,

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currently operates under two international agreements which entered into force on 12 February 1973, and which are adhered to by 89 member countries. As of 31 December 1974, there were 104 operating earth station antennas providing 11,507 full-time public international telecommunications channels to and from 82 earth stations in 60 countries.

The current Intelsat satellite system is composed of four operational Intelsat IV satellites, each with a capacity of 3,700 voice circuits, as well as capacity for a full-time channel for television transmission and submarine cable restoration. Thus, the total available capacity of the Intelsat system is in excess of 15,000 voice circuits. The operational reliability of the Intelsat satellite system is assured through a number of in-orbit spare satellites which are available in all three ocean regions for restoration of satellite service.

In the third quarter of 1975, Intelsat intends to introduce a new satellite series, known as the Intelsat IV-A. This new satellite, which will initially provide service in the Atlantic Ocean region, is to have a capacity of over 6,000 voice circuits.

As a result of the continued growth of Intelsat traffic and the increased efficiency of operation made possible with the Intelsat IV satellite series, the rates to signatories for Intelsat services have continued to decrease. The rate in effect for 1974, i.e., \$US 9,000 for one half of a telephone circuit, is less than one third of the original rate established by Intelsat in 1965.

Among the more significant actions of 1974 were: (a) the Intelsat Board of Governors decided to increase, from three to six, the number of Intelsat IV-A satellites to be purchased; (b) on 1 August, Intelsat entered into a cost-plus-fee management services contract with the Communications Satellite Corporation (Comsat) for specified technical and operational services (with all other functions to be performed by the Executive Organ of Intelsat); (c) the Executive Organ, headed by a Secretary-General and composed of an international staff of approximately 100, moved into new headquarters in Washington, D.C., on 1 July, and on 1 August completed the assumption of its functions as set forth in annex A to the Intelsat Agreement.

Other important events during 1974 included: (a) the first meeting of the Intelsat Assembly of Parties, which is composed of Governments which are parties to the Intelsat Agreement; (b) the second meeting of the Intelsat Meeting of Signatories, which is composed of all signatories (Governments or their designated telecommunications entities) to the Operating Agreement; (c) assumption by the Secretary-General of the responsibility for arranging notification of frequencies to the ITU for Intelsat satellites; (d) approval by the Intelsat Board of Governors of a draft letter of agreement from the Secretary-General of IMCO to the Secretary-General of Intelsat regarding the establishment of relations between the two organizations, subject to formal approval by the IMCO Assembly and the Intelsat Assembly of Parties.

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IV. NON-GOVERNMENTAL ORGANIZATIONS

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

The following brings up to date the section of the Review relating to COSPAR (paras. 662-686).

1. The Committee on Space Research (COSPAR) is a scientific committee of the International Council of Scientific Unions (ICSU) and was created in October 1958. The headquarters are located at 51, Boulevard de Montmorency, 75016 Paris, France.

2. The composition of the COSPAR Bureau is the following: President, Prof. C. de Jager (representative of the International Astronomical Union in COSPAR); Vice-Presidents - one position vacant resulting from the recent decease of Acad. A. A. Blagonravov (USSR Academy of Sciences), and Dr. H. Friedman (National Academy of Sciences of the United States); Members - Acad. G. Barta (Hungarian Academy of Sciences), Prof. Dr. W. Böhme (Academy of Sciences of the German Democratic Republic), Prof. K. Maeda (Science Council of Japan), and Sir Harrie Massey (Royal Society of the United Kingdom).

3. Membership of COSPAR

(a) International scientific unions: International Astronomical Union (IAU), International Union of Biochemistry (IUB), International Union of Biological Sciences (IUBS), International Union of Geodesy and Geophysics (IUGG), International Mathematical Union (IMU), International Union of Physiological Sciences (IUPS), International Union for Pure and Applied Biophysics (IUPAB), International Union for Pure and Applied Chemistry (IUPAC), International Union for Pure and Applied Physics (IUPAP), International Union of Theoretical and Applied Mechanics (IUTAM), International Union of Radio Science (URSI), International Union of Geological Sciences (IUGS).

(b) National scientific institutions of: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Czechoslovakia, Denmark, Finland, France, German Democratic Republic, Germany (Federal Republic of), Greece, Hungary, India, Indonesia, Iran, Israel, Italy, Japan, Mexico, Netherlands, Norway, Pakistan, Poland, Romania, South Africa, Spain, Sweden, Switzerland, United Kingdom, United States of America, Union of Soviet Socialist Republics.

4. Scope of the Committee

COSPAR is an interdisciplinary scientific organization concerned with the progress on an international scale of all kinds of fundamental research carried out with the use of rockets or rocket-propelled vehicles. Its primary purpose is to provide the world scientific community with the means whereby it may exploit the possibilities of satellites and space probes for all kinds of scientific purposes, and exchange the resulting data on a co-operative basis. Operating under the rules of ICSU, COSPAR ignores political considerations and considers all questions solely from the scientific viewpoint.

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5. Internal organization

Scientific activities of COSPAR are conducted by the following groups:

Working Group 1 on Tracking, Telemetry, and Dynamics

- Panel 1.A on Tracking, Instrumentation and Procedures
- Panel 1.B on Frequency Allocation and Radio Transmissions
- Panel 1.C on Satellite Geodesy and Geodynamics
- Panel 1.D on Lunar Laser Ranging

Working Group 2 on Experiments in Interplanetary Space and in the Magnetosphere

- Panel 2.A on Active Experiments
- Panel 2.B on Interplanetary Medium and its Interactions
- Panel 2.C on Structure of the Magnetosphere
- Panel 2.D on Magnetospheric Dynamics

Working Group 3 on Space Techniques as applied to Astrophysical Problems

- Panel 3.A on Galactic and Extragalactic Astronomical Measurements
- Panel 3.B on Solar Flares and Forecasts
- Panel 3.C on Cosmic Dust

Working Group 4 on Experiments in the Upper Atmosphere

- Panel 4.A on Structure of the Upper Atmosphere
- Panel 4.B on Interactions of the Neutral and Ionized Atmosphere
- Panel 4.C on Polar Ionosphere

Working Group 5 on Space Biology

- Panel 5.A on Gravitational Biology
- Panel 5.B on Radiation Biology
- Panel 5.C on Exobiology
- Panel 5.D on Planetary Quarantine

Working Group 6 on Applications of Space Research to Meteorology and Earth Surveys

- Panel 6.A on Weather and Climate
- Panel 6.B on Earth Resources and Environment
- Panel 6.C on Meteorology of the Stratosphere and Mesosphere

Working Group 7 on Space Related Studies of the Moon and PlanetsAdvisory Committee on Data Problems and Publications6. 1974 activities

The main scientific activity of COSPAR was conducted during its annual meeting (São Paulo, Brazil, 24 June-1 July 1974) and the COSPAR co-sponsored symposia organized in conjunction with that meeting or held elsewhere.

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(a) 17th Plenary Meeting of COSPAR and associated activities. The Plenary Meeting was preceded by a closed two-week (6-19 June, São José dos Campos, Brazil, at INPE) Workshop on Space Applications of Direct Interest to Developing Countries, which was attended by 28 invited representatives from developing nations. The first week of the workshop was dedicated to on-the-job-training on the utilization of ERTS images for the surveying of natural resources. During the second week, the programme focused on a total, systematic approach to the planning, conduct, control, and evaluation of projects dealing with the applications of space observing techniques to solve earth-resources management problems. On 19 June, p.m., there was a special session during which the participants reported on the results of their studies during the workshop. Officials from COSPAR and other organizations were present at this special session.

This workshop was followed by an open Seminar on the same subject (19-21 June, São José dos Campos, Brazil, at INPE), with the following main topics: Observing techniques and national applications; Applications to water and marine resources; Applications to land resources; Benefits of remote sensing from space. The two above events were organized by COSPAR and the Brazilian Space Research Institute (INPE) and financially supported by the United Nations Environment Programme (UNEP), International Council of Scientific Unions (ICSU), Comite Interamericano de Investigaciones Espaciales (CIIE), and the ICSU Committee on Science and Technology in Developing Countries (COSTED), as well as the organizers.

Two other scientific events preceded the main COSPAR Meeting:

- International Symposium on Solar Terrestrial Physics, sponsored by COSPAR, IAU, IUGG, URSI, IUPAP, and SCOSTEP (17-22 June, São Paulo, Brazil), and

- Symposium on Satellite Dynamics, sponsored by COSPAR, IAU, and IUTAM (19-21 June, São Paulo, Brazil).

As every year, the 17th COSPAR Plenary Meeting (São Paulo, Brazil, 24 June-1 July 1974) comprised, in addition to administrative meetings, the scientific sessions with presentations on latest significant results in the fields of activity of the COSPAR Working Groups. A number of resolutions and recommendations were adopted by this Plenary Meeting, one of them being of special interest to the United Nations. It reads as follows:

"COSPAR,

Accepts the recommendations of the Advisory Party (on Developing Countries) on matters pertaining to space research applications in developing countries, and

Decides to undertake, through the appropriate Working Group the preparation of manuals and/or informative material on the possibilities of development through space technology, and to distribute this material to the appropriate bodies in developing countries, including non-members of COSPAR, and further

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Decides that in the future, workshops, seminars and meetings on space application for development will be organized primarily on a regional basis, and that the respective Organizing Committees will include two representatives of the appropriate Working Group and four representatives from developing countries, and

Recommends that international training centers on different aspects of space technology applications be established on the basis of already existing facilities."

(b) The following events, co-sponsored by COSPAR, were held in other locations:

- Symposium on Solar X- and Gamma-Ray Astronomy (IAU Symposium No. 68, co-sponsored by COSPAR), Buenos Aires, Argentina, 11-14 June 1974.

- Colloquium on Planetary Satellites (IAU Colloquium No. 28, co-sponsored by COSPAR), Ithaca, N.Y., USA, 19-23 August 1974.

- Colloquium on Reference Co-ordinated Systems for Earth Dynamics (IAU Colloquium No. 26, co-sponsored by COSPAR and IAG-IUGG), Toruń, Poland, 26-31 August 1974.

- Colloquium on Study of Comets (IAU Colloquium No. 25, co-sponsored by COSPAR), Greenbelt, Md., USA, 28 October-1 November 1974.

- Symposium on Beacon Satellite Investigations of the Ionosphere Structure and ATS-F Data (sponsored by COSPAR and URSI), Moscow, USSR, 25-29 November 1974, on the invitation of the USSR Academy of Sciences.

7. Co-operation with other organizations

COSPAR actively co-operates with a number of intergovernmental and non-governmental international organizations.

(a) Intergovernmental international organizations:

United Nations Committee on the Peaceful Uses of Outer Space and its Scientific and Technical Sub-Committee. COSPAR maintains close contact with these United Nations bodies and is being represented at their meetings. The Committee on the Peaceful Uses of Outer Space has accorded consultative status to COSPAR. The Committee on Space Research benefited in the past from the attendance, at our annual meetings, of the Chief of the Outer Space Affairs Division and of the United Nations Expert on space applications.

United Nations Environment Programme. Thanks to the co-operation and support of the UNEP, it was possible for our Committee to organize the Workshop and Seminar on Space Applications of Direct Interest to Developing Countries listed under paragraph 6 (a) above. COSPAR contributes to the elaboration of the system of monitoring of environmental parameters with the use of space techniques by way of its reports through the ICSU Scientific Committee on Problems of the Environment (SCOPE).

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World Meteorological Organization. COSPAR contributes to the joint ICSU/WMO project, Global Atmospheric Research Programme (GARP), and maintains close collaboration with the Joint Organizing Committee created for this project. WMO is permanently represented in COSPAR Working Group 6 on Applications of Space Research to Meteorology and Earth Surveys.

World Health Organization. Contact is being maintained with WHO and this organization is represented on the COSPAR Working Group 5 Panel D on Planetary Quarantine.

International Telecommunications Union. COSPAR is a member in the Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science of ICSU, which elaborates, for the International Radio Consultative Committee (Comité Consultatif International des Radiocommunications) of ITU, the proposals regarding the protection and allocation of frequencies for scientific use.

European Space Research Organisation (ESRO). Close collaboration is being maintained with ESRO and their scientists actively participate in the work of the COSPAR Committee on Space Research through presentation of results of scientific experiments, carried out by ESRO, at the COSPAR meetings and symposia.

(b) International non-governmental organizations:

In addition to continuous co-operation with international scientific unions that are members in COSPAR, the Committee on Space Research maintains close contacts with various ICSU scientific and special committees, such as the Scientific Committee on Problems of the Environment (SCOPE), the Scientific Committee on Antarctic Research (SCAR), the Special Committee on Solar Terrestrial Physics (SCOSTEP) and ICSU inter-union commissions, namely the Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science (IUCAF) and the Inter-Union Commission for the Study of the Moon (IUCM). Friendly relations continue to develop with the International Astronautical Federation (IAF) and the International Academy of Astronautics (IAA).

8. 1974 Publications of the Committee on Space Research

COSPAR continued to publish its Information Bulletin (three times per year), which contains information pertaining to our Committee and to other bodies involved in scientific space research.

COSPAR Transactions No. 9, the up-to-date list of World Tracking Stations, appeared in early 1974.

The 1974 proceedings of the XVI COSPAR Meeting (Constance, Federal Republic of Germany, May-June 1973) comprised four volumes, published by Akademie-Verlag, German Democratic Republic:

- Space Research XIV - proceedings of open meetings of working groups in Constance and resumé of the Symposium on Noctilucent Clouds and Interplanetary Dust, Constance (physical sciences volume).

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- Life Sciences and Space Research XII - proceedings from open meetings of Working Group 5 on Space Biology, Constance.
- Proceedings of the Symposium on Methods of Measurements and Results of Lower Ionosphere Structure.
- Proceedings of the Symposium on Earth Survey Problems through the Use of Space Techniques.

COSPAR would like to bring this last volume to the attention of the membership of the United Nations Committee on the Peaceful Uses of Outer Space. The contents of these proceedings stress not so much the development of space techniques as their application to problems of major concern of earth scientists. For this reason, many of the international scientific unions concerned with different aspects of earth problems were represented: biology, geodesy and geophysics, geology, geography, radio, meteorology. Much of the interest centered on the results from the newly developed earth resources technology satellite, ERTS-1. The problems surveyed can be divided roughly into those related to biology, atmosphere and climate, water resources, and meteorology and earth surveys. Reports on national activities on these subjects are also included.

9. Plans for 1975

In addition to the current scientific work conducted within the COSPAR Working Groups, the major effort of our Committee in 1975, is organization of the XVIII COSPAR Meeting and Related Activities which are to take place in Varna, Bulgaria, from 29 May through 7 June. The following events will be held in Varna:

- COSPAR/IAU Symposium on Fast Transients in X- and Gamma-Rays, 29-31 May;
- COSPAR Symposium on Results from Co-ordinated Upper Atmosphere Measurement Programmes and Workshop for Discussing Plans for such Future Programmes, 29-31 May;
- COSPAR/IUPS/IAA Symposium on Gravitational Physiology, 30-31 May;
- Open meetings of COSPAR working groups (2-7 June), including the following topics: satellite altimetry techniques and applications to oceanography; upper atmosphere research using satellite tracking and drag observations; new satellites useful for geodynamics; study of travelling interplanetary phenomena; active experiments; astronomical observations; particle storage and propagation in solar corona; flare forecasting; solar observations; interrelation of sun and interplanetary dust; cosmic dust observations; minor constituents in stratosphere, mesosphere, and thermosphere; gravitational biology; radiation biology; exobiology; planetary quarantine; utilization of rocket and satellite data for stratospheric and mesospheric research; meteorology; earth surveys; analysis of results from lunar and planetary missions; as well as other latest significant results in the fields of interest of the COSPAR working groups.

Apart from the above events, COSPAR will cosponsor the following meetings in 1975:

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- Workshop on Laser Ranging (sponsored by COSPAR and IAG-IUGG), Prague, Czechoslovakia, 11-15 August.
- Session on High Latitude Phenomena (sponsored by IAGA-IUGG and COSPAR), Grenoble, France, 27-28 August.
- Symposium on Transport Phenomena and Structure in the Thermosphere and Exosphere (sponsored by IAGA-IUGG, COSPAR, and URSI), Grenoble, France, 29-30 August.
- Session on solar wind interactions with other bodies (sponsored by IAGA-IUGG and COSPAR), Grenoble, France, 30 August-1 September.
- Symposium on evolution of planetary atmospheres (sponsored by IUGG, COSPAR, and URSI), Grenoble, France, 1-2 September.

C. International Astronautical Federation (IAF)

The following brings up to date the section of the Review on IAF (paras. 687-721).

In October 1974 the International Astronautical Federation admitted two new members, the Indonesian Space Society and the Association in Scotland for Technology and Research in Astronautics (ASTRA).

The Bureau of the IAF has been enlarged by the addition of a fifth Vice-President. Following the elections held at Amsterdam in October 1974, the Bureau for the current year is composed as follows:

President: L. Jaffe (United States of America)
Past president: L. G. Napolitano (Italy)
Vice-presidents: M. Barrère (France)
W. Fiszdon (Poland)
E. M. Knoernschild (Federal Republic of Germany)
G. Marx (Hungary)
L. I. Sedov (Union of Soviet Socialist Republics)
Ex officio members: C. S. Draper (United States of America), President, IAA
I. H. Ph. Diederiks-Verschoor (Netherlands), President, IISL
General Counsel: V. Kopal (Czechoslovakia)

Professor Napolitano was designated as the Bureau member in charge of international relations. Mr. Barrère was designated as the Bureau member in charge of financial matters.

A new Committee on Developing Countries was established with a view to expanding the possibilities of these nations to benefit by the knowledge available in the IAF as a result of space activities. This action is in line with the desire to encourage the participation in IAF programmes of scientists in countries where there is no group ready to qualify for membership in the Federation.

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Considered in this connexion is the organization of a workshop on applications of remote sensing that might be held in 1976, and the possibility of IAF participation in seminars on other space-related topics organized by the United Nations or other international bodies.

The subject of "Reliability of space systems" appeared for the first time in the programme of the 25th Congress at Amsterdam, and was maintained for the 26th Congress to be held in Lisbon in September. Another exploratory topic selected for the Congress in Lisbon is "Space technology and lighter-than-air systems".

The general theme chosen for the 26th Congress is "Space and energy".

A report entitled "Ground systems for receiving, analyzing and disseminating earth resources satellite data", produced by a Working Group of the IAF Committee on Application Satellites, was published. Copies can be obtained upon request to the IAF secretariat. Special arrangements have been made with an American member of the IAF, the American Institute of Aeronautics and Astronautics (AIAA) in New York, for the sale and distribution of this publication.

Pursuing its efforts to stimulate the interest of young people in space-related subjects, the IAF awarded a first, second and third prize for papers presented at the 4th International Student Conference during the 25th Congress in Amsterdam. Prizes will continue to be given each year. Gold medals have been offered by two IAF member societies to accompany first prizes.

International Academy of Astronautics (IAA)

The December 1974 election of the Academy brought the total membership to 520 in 29 countries.

Some changes have occurred in the composition of the Board of Trustees, including the recent death of a Vice-President. The Board for the current year is composed as follows:

President: C. S. Draper (United States of America)
Past president: F. J. Malina (United States of America)
Vice-presidents: H. A. Bjurstedt (Sweden)
E. A. Brun (France)
A. Mikhailov (Union of Soviet Socialist Republics)
(one vacancy)
Trustees:
Section 1: M. Nicolet (Belgium), Chairman
N. Boneff (Bulgaria)
H. Elliot (United Kingdom)
F. L. Whipple (United States of America)

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Trustees: (continued)

Section 2: R. Pešek (Czechoslovakia), Chairman
A. Jaumotte (Belgium)
J. M. J. Kooy (Netherlands)
L. I. Sedov (Union of Soviet Socialist Republics)

Section 3: R. K. Andjus (Yugoslavia), Chairman
O. G. Gzenko (Union of Soviet Socialist Republics)
A. Graybiel (United States of America)
E. A. Lauschner (Federal Republic of Germany)

Ex officio members: L. Jaffe (United States of America), President, IAF
I. H. Ph. Diederiks-Verschoor (Netherlands), President,
IISL

The Academy held several scientific meetings during the 25th IAF Congress in Amsterdam in October 1974, viz.:

- 4th International Symposium on Cost Reduction in Space Operations
- 8th International Symposium on History of Astronautics
- 7th International Space Rescue and Safety Symposium
- 3rd International Review Meeting on Communication with Extra-Terrestrial Intelligence (CETI)
- Round Table on Space Stations - Present and Future - Scientific and Technological Opportunities; Identification of Legal Problems Involved

The Daniel and Florence Guggenheim International Astronautics Award for 1974 was given to Professor Hilding A. Bjurstedt, Director of the Laboratory of Aviation Medicine at the Karolinska Institutet, Stockholm (Sweden).

The President's annual report for the year 1973-1974 (issued in August 1974) gives details of ongoing activities, including the publication of proceedings of scientific meetings and the Academy's journal, Acta Astronautica.

International Institute of Space Law (IISL)

The Board of Directors of the IISL for the current year is composed as follows:

Honorary President: E. Pépin (France)
President: I. H. Ph. Diederiks-Verschoor (Netherlands)
Vice-presidents: E. Galloway (United States of America)
G. P. Zhukov (Union of Soviet Socialist Republics)
Secretary: E. Fasan (Austria)

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Members: M. Bodenschatz (Federal Republic of Germany)
A. A. Cocca (Argentina)
A. Francoz Rigalt (Mexico)
I. Herczeg (Hungary)
F. Ikeda (Japan)
V. Kopal (Czechoslovakia)
P. Magno (Italy)
A. Priyatna (India)
G. Reintanz (German Democratic Republic)
M. Smirnoff (Yugoslavia)
E. Wyzner (Poland)

The Institute continues to hold its annual Colloquium on the Law of Outer Space during the IAF congresses. Among the topics dealt with at the 17th Colloquium in Amsterdam in October 1974 were direct broadcasting by satellite, interpretation of space treaties, prospects of space law, and legal aspects of space stations.

The IISL continues to publish an annual Worldwide Bibliography of Space Law and Related Matters, and is preparing a booklet giving the background and other information on the Institute.
