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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 1972*

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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. This is the first supplement to the first published issue (A/AC.105/100 and Corr.1; United Nations publication, Sales No. E.72.I.11), which covered events up to 1971.

** Not included. No additional information has been received.

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** Not included. No additional information has been received.

I. UNITED NATIONS

A. Committee on the Peaceful Uses of Outer Space

1. During 1972, 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. Following the appointment of its former Chairman, Mr. Kurt Waldheim (Austria), as Secretary-General of the United Nations, and the assignment of Ambassador Diaconescu (Romania) to a new post, the Committee met in May to elect its new Chairman and Vice-Chairman. Mr. Peter Jankowitsch (Austria) was elected Chairman at this meeting, and Mr. Ion Datcu (Romania) Vice Chairman. Mr. Celso Antonio de Souza e Silva (Brazil) continued to serve as Rapporteur.
3. The session of the Legal Sub-Committee in April/May in Geneva was followed by the session of the Scientific and Technical Sub-Committee in May, in the course of which the Working Group on the Remote Sensing of the Earth also held an organizational meeting.
4. The Committee met again in September to consider the reports of its Legal Sub-Committee and Scientific and Technical Sub-Committee, and made its recommendations on the work of these two sub-committees, and on other matters dealt with during the session, in the report it submitted to the twenty-seventh session of the General Assembly (A/8720).

Activities of the Committee

(a) Legal activities

5. In its resolution 2776 (XXVI) of 19 December 1971, the General Assembly endorsed the recommendations of the Committee concerning the future work of its Legal Sub-Committee. In accordance with these recommendations, priorities were given to matters relating to the registration of objects launched into outer space for the exploration or use of outer space, and to questions relating to the moon. These two items were considered by the Legal Sub-Committee at its eleventh session, held in Geneva from 10 April to 5 May 1972, in the course of which it undertook the formulation of articles for the draft international agreements concerning the two subjects. The results of its deliberation on these two items as well as other items considered by the Legal Sub-Committee at its eleventh session were set out in the report of the Sub-Committee (document A/AC.105/101).
6. Reviewing the report of the Legal Sub-Committee at its fifteenth session, held in New York in September, the Committee noted that considerable progress had been made on the work of the Sub-Committee in these two fields. It recognized at the same time that agreement had yet to be reached on certain provisions of the

draft international treaty relating to the moon, and the draft international convention on registration of objects launched into space, which the Sub-Committee had formulated in its report.

7. With regard to other items before the Legal Sub-Committee at its eleventh session (the various implications of space communications: report of the Working Group on Direct Broadcast Satellites; matters relating to the definition and/or delimitation of outer space and outer space activities; matters relating to the activities carried out through remote sensing satellite service of earth resources), the Committee noted that although some delegations recorded their views on those questions, the Sub-Committee, because of lack of time, did not consider these subjects in any detail.

8. The Committee recommended that the Legal Sub-Committee should pursue its work on the draft treaty relating to the moon as well as the draft international convention on registration of objects launched into space as a matter of priority at its next session. This recommendation was later approved by the General Assembly in resolution 2915 (XXVII) of 9 November 1972.

9. Accordingly, the Legal Sub-Committee during its twelfth session held in New York from 26 March to 20 April 1973 continued to consider these items on a priority basis, during which further progress had been made on the formulation of articles for the two drafts. Following further deliberations and consultations on outstanding issues on these drafts, the Legal Sub-Committee recommended that the Committee on the Peaceful Uses of Outer Space consider the two drafts at its next session in June/July with a view to finalizing them for submission to the twenty-eighth session of the General Assembly. 1/

10. In the course of the consideration of questions relating to international co-operation in the peaceful uses and exploration of outer space during the twenty-seventh session, the General Assembly also considered an item submitted by the USSR entitled "The preparation of an international convention on principles governing the use by States of artificial earth satellites for direct television broadcasting". It adopted two resolutions in connexion with the consideration of this item. Under resolution 2916 (XXVII) of 9 November 1972, the General Assembly considered it necessary to elaborate principles governing the use by States of artificial earth satellites for direct television broadcasting with a view to concluding an international agreement or agreements; requested the Outer Space Committee to undertake the elaboration of such principles as soon as possible; and requested the Secretary-General to transmit to the Committee all documentation relating to the discussion of the question at the twenty-seventh session. The Assembly also took note that the work done on the draft convention on the freedom of information and deliberations thereon in the General Assembly might be useful in the discussion and elaboration of international instruments or United Nations arrangements concerning direct television broadcast (resolution 2917 (XXVII)).

1/ For the report of the Sub-Committee on the work of its twelfth session, see document A/AC.105/115.

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(b) Scientific and technical aspects

11. In the scientific and technical fields, the Committee, after reviewing the work of the ninth session of the Scientific and Technical Sub-Committee held in New York from 3 to 12 May, endorsed the various recommendations made by the Sub-Committee with a view to further promoting international co-operation in the peaceful exploration and uses of outer space, as set out in its report in document A/AC.105/102. The Committee endorsed, in particular, the Sub-Committee's recommendation for the 1973 United Nations programme on practical applications, which consisted essentially of the continuation of the holding of scientific panels on important aspects of space applications in various parts of the world; administration of fellowships offered by Member States in the area of practical applications as well as space technology in general; and visits by the United Nations Expert on space applications to developing countries with a view to creating awareness of the potential of space applications to development plans and programmes in developing countries (see below paras. 22 to 26).

(i) Remote sensing of the earth by satellites and other platforms

12. The role of satellites and other space platforms in remote sensing of earth resources as well as the human environment was given close attention by the Committee during its work in 1972. The Committee in this connexion welcomed the progress made by the Working Group on Remote Sensing of the Earth by Satellites, established by the Scientific and Technical Sub-Committee in 1971, in studying various means of furthering international co-operation in this new field of practical applications. At a preparatory session held in the course of the ninth session of the Scientific and Technical Sub-Committee in May 1972, the Working Group dealt with a number of future programmes of the Working Group.

13. The Committee, having noted the summary of activity of the Working Group at this preparatory session, as reported by it to the Scientific and Technical Sub-Committee, expressed the view that it looked forward to receiving a substantive report of the Sub-Committee on the progress of the work of the Working Group. 2/

(ii) Direct broadcast satellites

14. The Committee considered new developments having a bearing on the activity of its Working Group on Direct Broadcast Satellites. It noted in this connexion that a number of important events and developments that had taken place since the Working Group last met in 1970, had made it necessary for a review of these developments and for the Working Group to report on the significance of these developments to the Committee. Among these significant developments the following were cited: (a) the recommendations adopted by ITU at the 1971 World

2/ At a session held in February 1973, the Working Group further considered its future programme concerning the various aspects of remote sensing. For the report of the Working Group to the Scientific and Technical Sub-Committee, see document A/AC.105/111.

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Administrative Radio Conference for Space Telecommunications, dealing with the allocation of frequencies for all space communications, and with the technical and administrative regulations concerning the establishment and operations of satellite communications system; (b) the draft declaration of guiding principles on the use of satellite broadcasting for the free flow of information, the spread of education and greater cultural exchange, transmitted by the Director-General of UNESCO to the Secretary-General (A/AC.105/104); (c) the ongoing work performed by UNESCO and the World Intellectual Property Organization (WIPO) with regard to the protection of television signals transmitted via satellites; and (d) the request of the USSR for the inclusion in the agenda of the twenty-seventh session of the General Assembly of the question of the elaboration of an international convention on principles governing the use by States of artificial earth satellites for direct television broadcasting.

15. Accordingly, the Committee recommended that the Working Group on Direct Broadcast Satellites meet during 1973 to consider those matters and to inform the Committee on any significant developments on which action might be required.

(iii) Space technology and the environment

16. In reviewing space technology and the environment, the Committee recognized the increased importance of the new technology in the monitoring and control of the human environment, and took note of the various activities in which the United Nations, through the Outer Space Affairs Division, had participated in international meetings and seminars concerning the potential use of space technology in this new field. In this connexion it adopted the recommendation that, should the report of the Stockholm conference be adopted by the General Assembly, the Chairman of the Committee and the Secretary-General should establish appropriate contact with the proposed new international organization for the environment concerning the future activity of the Committee in the area of space technology on the human environment. The Committee furthermore took note of the suggestion made during its session, that the United Nations should undertake the preparation of a pamphlet written in lay language and illustrated wherever possible, for the purpose of drawing the attention of policy-makers, economists and those responsible in economic development to the potential of this new technology in development programmes.

(iv) Education and training

17. The Committee took note of the various offers of scholarships extended by Member States in the area of practical applications as well as in space technology in general and expressed its appreciation to the renewal of such offers made by the Governments of the United States, the United Kingdom, Italy, France, Brazil, India and Japan. The Committee noted at the same time the views expressed by some of its members that wherever practical and feasible, offers of scholarships should include travel grants to enable more candidates from developing countries to fully take advantage of such offers. The Committee also recognized the importance of greater participation by representatives from developing countries in technical panels organized by the United Nations and

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urged countries capable of doing so to hold such technical panels with a view to imparting useful knowledge on programmes of practical applications being carried out in their respective countries.

(v) Exchange of information

18. In the area of exchange of information, the Committee continued to receive information on the national space activities and programmes from most of the Member States referred in paragraph 17 of the Review. In addition, the following countries submitted information on their national and international co-operative space programme during 1972: Barbados, Central African Republic, Guatemala, Iceland, Ivory Coast, Jamaica, Lebanon, Niger, Singapore, Upper Volta, Venezuela. The information received was submitted to the Scientific and Technical Sub-Committee for use as part of the documentation for the consideration of the various items before it at its tenth session in May (A/AC.105/L.68 and Add.1 to 3).

(vi) International sounding rocket launching facilities

19. The Thumba Equatorial Rocket Launching Station (TERLS) in India and the CELPA Mar del Plata International Rocket Launching Facilities, in Argentina, continued to submit reports during 1972. The Committee took note of their reports with appreciation, and decided to recommend that the General Assembly continue sponsorship of the two ranges. It also welcomed the announcement made by Sweden that the ESRANGE/Kiruna range had been made available by the Swedish Government for international co-operative projects. In the course of the consideration of the reports of the TERLS and CELPA ranges, the Committee heard suggestions made by some of its members that the Thumba Equatorial Rocket Launching Facilities be named in honour of Mr. Vikram Sarabhai, one of the founding fathers of the Indian space programmes who had recently passed away.

B. United Nations Secretariat

Outer Space Affairs Division

20. As the Secretariat unit responsible for assisting the Secretary-General in discharging the United Nations responsibility in international co-operation in the peaceful uses of outer space, the Outer Space Affairs Division continued during 1972 to implement the decisions and recommendations in this field made by the General Assembly and the Committee on the Peaceful Uses of Outer Space.

21. In this connexion, the Division provided substantive secretariat services during the fifteenth session of the Committee on the Peaceful Uses of Outer Space, the ninth session of the Scientific and Technical Sub-Committee, and the organizational session of the Working Group on Remote Sensing of the Earth by Satellites; assisted the secretariat of the First Committee of the General Assembly during the consideration of outer space items during the twenty-seventh session; 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. With regard to the Working Group on Remote

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Sensing of the Earth by Satellites, the Division prepared a paper assessing all documentation made available to the Working Group and other relevant sources on the various aspects of remote sensing - including technical, economic and social, legal and organizational - for use by the Working Group in its second session in February 1973. ^{3/} This paper, which was revised in accordance with suggestions made by a task force of the Working Group appointed to assist the Secretary-General in that task, was subsequently considered by the Working Group at its second session in February 1973. A supplement to the paper incorporating corrections, suggestions and addenda suggested by the Working Group is being issued for the tenth session of the Scientific and Technical Sub-Committee in May 1973. Two other reports ^{4/} in connexion with remote sensing were prepared by the Division with the assistance of consultants and in accordance with a decision of the Scientific and Technical Sub-Committee they had been brought to the attention of the 1972 United Nations Conference on the Human Environment.

22. In the area of the United Nations programme on practical applications, the Division assisted the Expert on space applications in organizing two technical panels during 1972. ^{5/} One of the panels was a joint UN/WMO panel and training seminar on the use of meteorological data, held at the invitation of the Mexican Government, in Mexico City from 29 November to 8 December 1972. Organized on a regional basis, the panel was attended by professional meteorologists from Member States in the Latin American region, including many participants from Mexico. A team of instructors, consisting of experts in the field from the United States, Federal Republic of Germany and Japan was assigned the task of conducting the training seminar. The report of this seminar is contained in document A/AC.105/113.

23. The second United Nations panel during 1972 was held in New Delhi and Ahmedabad from 12 to 20 December, at the invitation of the Indian Government. The panel, which was attended by participants from several Member States in the ECAFE and ECA regions, including many participants from India, dealt with satellite instructional television systems. Its purpose was to discuss such systems in general and to study and observe, in particular, the planning, preparation and hardware aspects of the Indian Satellite Instructional Television Experiment (SITE). Eight experts specially invited by India for that purpose from Brazil, Canada, Federal Republic of Germany, and the United States of America, participated and addressed the panel. The report of the panel is contained in document A/AC.105/114.

24. The Division also continued to provide assistance to the Expert on space applications on the administration of fellowships in practical applications, as

^{3/} Background paper by the Secretary-General assessing United Nations documents and other pertinent data related to the subject of remote sensing of the earth by satellites (A/AC.105/C.1/WG.4/CRP.7).

^{4/} The use of earth survey satellites in monitoring the changes in the global environment (A/AC.105/C.1/VII/CRP.1) and The role of earth satellites in the study of the human environment (A/AC.105/C.1/VIII/CRP.2).

^{5/} Report of the United Nations Expert on space applications to the Scientific and Technical Sub-Committee, A/AC.105/112.

well as in space technology in general, offered by Member States. Such offers of scholarships were renewed during 1972 by Brazil, Italy, Japan, the United Kingdom and the United States.

25. Also in implementation of the United Nations programme on practical applications during 1972, the Expert on space applications, accompanied by a member of the Outer Space Affairs Division, visited a number of countries in Asia, including Iran, Pakistan, India, Thailand, Indonesia and the Philippines in the course of which consultations had been held with governmental space agencies and other interested government agencies with a view to furthering international co-operation in the area of practical applications. Consultations were also held by the Expert with the Government of Japan in connexion with the invitation which had been extended by Japan to hold a technical panel on space communications and education during 1974.

26. Activities related to liaison work with the specialized agencies were continued during 1972, especially in connexion with the holding of technical panels - including the Mexican panel on the use of meteorological satellite data which was sponsored jointly with the WMO, and the Indian panel on satellite instructional television systems, which was held with the co-operation of UNESCO and ITU. Consultations were also being held with UNESCO and ITU, in connexion with a panel planned for 1973 in Africa on satellite broadcasting systems for education and development, and another panel planned for 1974 for education in Japan on satellite broadcasting systems.

27. Likewise, liaison work was maintained with international governmental and non-governmental organizations concerned with international co-operation in the peaceful uses of outer space, including COSPAR, IAF, ESRO and ELDO. COSPAR had in this connexion prepared a paper on remote sensing during 1972 for use by the Committee on the Peaceful Uses of Outer Space and the United Nations Stockholm Conference on the Human Environment, where the paper was submitted as part of the documentation prepared by the conference secretariat. ^{6/}

28. Close co-operation was also maintained with other units in the United Nations Secretariat, including those of the regional economic commissions. One immediate objective, in the co-operation with the secretariat of the regional commissions, was to assist the Committee on the Peaceful Uses of Outer Space to bring closer to the developing countries the potential of space technology to economic development. Consultations were held in this connexion with the secretariat of ECAFE on the possibility of holding a joint seminar on remote sensing for 1974 in a country of the ECAFE region. Arrangements to that effect, if feasible, would be worked out during 1973.

29. Close co-operation was also maintained with WMO in connexion with a jointly sponsored seminar on meteorological satellite data in May 1973 to be held in

^{6/} COSPAR Report on the Applications of Space Techniques to some Environmental Problems: Prepared by COSPAR Working Group 6 for the United Nations and the Scientific Committee on Problems of the Environment (September 1972).

France, and in connexion with the implementation of General Assembly resolution 2914 (XXVII) on international co-operation in the mitigation of the harmful effects of tropical storms and the WMO Plan of Action on the Tropical Cyclone Project.

30. During the 1972 United Nations Conference on the Human Environment, the Outer Space Affairs Division, in close co-operation with the secretariat of the Conference, had organized a panel on the use of remote sensing from aircraft and spacecraft for monitoring the environmental changes and conditions where experts from members of the Outer Space Committee from Brazil, India, Italy, Sweden and the United States participated.

Office of Science and Technology

31. The report prepared by the late Mr. Vikram A. Sarabhai and his colleagues Mr. P.D. Bhasvar, Mr. E. V. Chitnis and Mr. P. R. Pisharoty for the Advisory Committee on the Application of Science and Technology to Development (see paragraph 116 of the Review) has been printed in the form of a booklet. It will be available in 1973 under the title The Application of Space Technology to Development and circulated in four languages (E.F.S.R. 72.II.A.12). The English version was issued in March 1973.

Resources and Transport Division

32. At the preparatory session of the Working Group on Remote Sensing of the Earth by Satellites, May 1972, the Resources and Transport Division presented a comprehensive statement concerning its interest in remote sensing from space, stressing the need of a continued close co-operation between the Working Group and the United Nations Committee on Natural Resources.

33. In the note prepared by the Secretary-General for the third session of the Committee on Natural Resources (E/C.7/36) on mineral exploration and production it is stated that "as a first step in the judicious selection of project areas, it is expected that satellite photography - and especially that forthcoming from the Earth Resources Observation Systems (EROS) and the Earth Resources Technology Satellite (ERTS) programmes of the United States of America - will provide a better basis for broader interpretation than that available from lower level photography. Particularly in respect of the large structures which are of fundamental importance in both the channelling and the localizing of mineral-bearing solutions, the study of the data obtained from high-level platforms will become an orthodox first step in framing large-scale exploration programmes". Already, the United Nations executed mineral exploration project in Lesotho is systematically studying the available ERTS-A imagery with a view to applying this information in the search for diamond-bearing Kimberlite intrusions. The study is expected to be of considerable practical value, as it will be supported by detailed ground-truth observations and also by data from low-level multispectral surveys previously carried out over parts of the project area.

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34. Representatives of the Resources and Transport Division participated in the second session of the Working Group on Remote Sensing of the Earth by Satellites which was held in New York from 29 January-10 February 1973. Statements on the application of satellite data to geological investigations and on aerial and satellite survey methods for mapping were presented. Following these presentations the Working Group concluded that "as an item of priority, in view of the already demonstrated positive and real possibilities of remote sensing from space in the area of cartography suitable measures should be taken to acquaint Member States, and especially developing countries, of such possibilities which might greatly enhance their means for natural resources planning on a rational basis".

35. With regard to recent activities of the Division in the field of cartography the United Nations Group of Experts on Geographical Names during its fifth session, 5-16 March 1973, emphasized the importance of naming extraterrestrial features, including those features on the moon and other planets being mapped on the basis of data from satellites. The Group took into consideration the fact that mapping is now done at scales 1:250,000 and larger. Its Working Group on Extraterrestrial Features will consider the extent to which names should be allocated and invite agencies that are already engaged in extraterrestrial mapping to submit details of their programmes on names. Guidelines will be prepared by the Working Group concerning various methods of naming for future study. No system of naming will be rejected outright. In this respect the group will seek the assistance of the States Members of the United Nations and the specialized agencies. Methods for identifying small features will be investigated and tested. The Working Group on Extraterrestrial Features has also been charged with examining how best to achieve legal international status for names allocated to extraterrestrial features.

36. The seventh United Nations Regional Cartographic Conference for Asia and the Far East which is to take place in Tokyo, Japan, from 15 to 27 October 1973, will consider the following items concerned with outer space: remote sensing, mapping methods, environmental control and earth resources satellites for surveying, mapping and earth resources studies. Reports on the discussions and considerations concerning these two items during the Conference will be submitted at a future date.

C. United Nations Development Programme (UNDP)

The following text replaces the corresponding paragraphs of the Review.

145. The most important result of this project was the development in India of a competent group of engineers who, as a result of their association with the initial development of the Centre, which has become known as the Experimental Station Communication Earth Station (ESCES), have been able to undertake such tasks as the planning and design of commercial type earth stations for India and are now participating in the project described in paragraph 148 below. In addition the Centre has provided basic courses in satellite communication techniques not only to Indian engineers and technicians but also to those of numerous other countries. These basic courses continue as a regular feature of the Centre's activities.

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148. Under an extension of the earlier mentioned UNDP Indian telecommunication project, UNDP is providing assistance in the modification of ESCES to enable it to play its part in a Satellite Instructional Television Experiment (SITE) in conjunction with the ATS-F satellite expected soon to be launched by the United States National Aeronautical and Space Administration. The ESCES is presently being modified to enable it to transmit and receive television signals, television transmitting and studio equipment are being added to it, and development work is being carried out on the production of television receivers suitably modified to accept signals from the satellite. It has been pointed out by the Indian Government that the experiments using communication satellites which are conducted in India will provide experience which can be made available for the benefit of all other developing countries and may well provide useful guidelines for the widespread application of direct broadcast satellite techniques to the problems of mass education throughout the world.

149. Another project for assisting eight Latin American Governments to make a feasibility study of a regional communication satellite system for accelerating educational and cultural development is now nearing completion and its report is expected to be published during 1973. In Latin America, and particularly in the Andean region, illiteracy remains a problem and is matched by a growing shortage of teachers. In many of the remote, almost inaccessible mountain regions conventional education methods are difficult to apply in practice. The Governments of the region, concluding that conventional measures would not remedy the situation quickly, have sought a report on the practicability of developing a regional educational television system, together with a review of all possible transmission and distribution systems, including the use of direct broadcast satellites. With the full co-operation of nationals of the countries concerned, a joint UNESCO/ITU project team has compiled a large quantity of data in a wide variety of disciplines related to both the education and communication sectors. The team is proceeding simultaneously with an analysis of this data and should complete its work before the end of 1973. The project report will enable the Governments concerned to make decisions on the financing, ownership, organization and operation of educational television broadcasting systems on both a national and a regional basis. They will also be provided with a wealth of data on the most practicable technical characteristics of the systems needed to provide adequate coverage of the region.

150. Between them, these projects have great potential for change. On the one hand, the Latin American project will provide, in relatively short time, a profound study of all the many political, administrative, organizational and technical problems involved in the establishment of a multinational educational television satellite system. On the other hand, over a somewhat longer period, the Indian programme will provide a measure of invaluable practical experience of the operation and effectiveness if such a system is instituted in a single country which nevertheless contains within its borders a great diversity of cultural and economic background. If these two projects lead ultimately to large-scale investment in fully operational systems, their impact on future development efforts may well be profound. Of course, in several domains, and in particular in agriculture, great care is needed to ensure that the information transmitted is of local relevance, is timely in regard to such factors as seasons and weather and

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is fully integrated with field demonstration, discussion groups and other educational activities. Convinced of their promise, UNDP will continue to do all it can to promote the development of direct broadcasting techniques and their application for the benefit of developing countries.

153. Given the important role of computers in the handling of information provided by sensors and other space equipment, it might be mentioned that the UNDP and its co-operating agencies are providing practical training in computer programming and operations in developing countries on every continent. One of the major problems presented by outer space technology is the timely processing, interpretation and use of an enormous mass of information. Thus a major effort in instruction and training of processing and other specialists will be necessary if the developing nations are to take full advantage of this new technology.

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II. SPECIALIZED AGENCIES

A. International Telecommunication Union (ITU)

The following text has been submitted to bring up to date the section on ITU (paragraphs 165-299 of the Review).

Paragraph 234: for the last sentence substitute

The Radio Regulations as revised by the 1971 World Administrative Radio Conference for Space Telecommunications entered into force on 1 January 1973 for those countries, members of the Union, which have ratified the new and revised texts.

Paragraph 237: add

In 1972, IFRB received 1,110 frequency assignment notices from 24 different administrations. A notable feature of these notices has been the increase in the number of assignments for the establishment or modification of experimental or research space systems.

After paragraph 254: insert

As pointed out in paragraph 248, the work of CCIR in the field of space communications has been so extensive in recent years that even a brief analysis of these activities would be beyond the scope of a report of this nature. Furthermore, the work of CCIR is normally highly technical in character, dealing with the development, standardization and application of space techniques and systems. Reports, recommendations and comments originated by CCIR are circulated to member administrations and technical and scientific organizations dealing with the operation and development of such systems.

The World Administrative Radio Conference for Space Telecommunications (1971) invited CCIR to continue and extend studies on space questions. The latest interim meetings of CCIR study groups dealing with questions on space systems took place in Geneva (5-21 July 1972) and a number of examples, illustrative of current ITU activities in this field, may be selected from the published conclusions, of the study groups. It should be observed that the conclusions, whilst representing the latest findings of the study groups, are published in draft form and these drafts will not be adopted as official CCIR texts until they have been approved by the XIIIth Plenary Assembly in 1974.

An example of a continued study programme is the work of the CCIR in preparing additional and revised resolutions and reports relating to the sharing of the same frequency bands by terrestrial and space radiocommunications systems.

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Draft reports and recommendations have been published dealing with the utilization and future development of satellite systems for the point-to-point transmission of telephony and television signals.

In the 1971 review particular reference was made to activities of CCIR in the field of satellite broadcasting. Considerable progress has been recorded in this field, as indicated in the draft report presenting all data available concerning systems for sound and television broadcasting from satellites. The report notes that, although provisional in nature, the data presented are sufficiently accurate and wide in scope, at least as regards the technical aspects of the problem, to serve as a basis for consideration of the system to be used in the broadcasting-satellite service. Terminology relative to the use of space communications techniques for broadcasting has also been dealt with in a separate report.

Progress was made in the study of the efficient use of the geostationary satellite orbit, and reports on this, and related subjects, have been published in the conclusions.

Advances in the CCIR study programmes in the fields of radiocommunications requirements for space research, meteorological satellite systems and earth exploration satellites and the protection of radioastronomical observations were reported.

After paragraph 256: insert

The Vth Plenary Assembly of CCITT was held in Geneva during the period 4-15 December 1972. The results of this Plenary Assembly, and of the final meetings of the various study groups for the period 1968-1972 which immediately preceded the Plenary Assembly, provide the opportunity to assess progress of the CCITT work in the field of space telecommunications.

Progress has been recorded in the integration of satellite circuits into the world-wide telephone network. Work is continuing on the question of interworking between terrestrial and satellite systems designed to utilize demand assignment channels. A notable achievement during the study period was the completion of specifications for a new international signalling system which was extensively tested during field trials on all types of intercontinental circuits, including those carried in satellite systems.

A number of new questions relating to the development of satellite circuits has been adopted. The development and standardization of digital transmission systems is becoming increasingly important and the capability of satellite systems in this field will be studied, specifically:

"What recommendations should be made regarding the setting up of complete digital international circuits which make use of the digital capability of certain satellite communications systems?"

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During the study period 1968-1972 a number of the Asian countries, members of the Plan Committee for Asia and Oceania, indicated interest in initiating technical and economic studies within ITU concerned with the development of domestic or regional satellite systems. It was agreed that such work falls within the terms of reference of a joint CCITT/CCIR autonomous working group administered by CCITT. The results of the studies to be undertaken will be presented in additional texts in the existing manual on Economic and Technical Aspects of the Choice of Transmission Systems.

Paragraph 274: add

ITU was responsible for organizing study programmes in the field of space communications, in four host countries, for a total of 10 fellows during 1972.

Paragraph 275: add

ITU organized no seminars on the subject of space communications during 1972 but staff members participated on a number of occasions in study groups and panels arranged by other organizations. Notable among these occasions was the United Nations Panel Meeting on Satellite Television Systems, held in Delhi and Ahmedabad in India in December.

After paragraph 287: insert

The Technical Cooperation Department (TCD) of ITU has continued to co-operate with the Government of India in the preparations for the Satellite Instructional Television Experiment (SITE), which was originally scheduled to commence in 1974. Unfortunately, the launch of the Application Technology Satellite (ATS-F) has been delayed from 1972 until 1974 and this factor, together with other difficulties associated with preparatory work in India, has resulted in the prolongation of the initial phase of the project.

As executing agency for UNDP, ITU is assisting the Government of India in the following areas:

(a) The redesign and modification of the existing Experimental Satellite Communication Earth Station (ESCES) at Ahmedabad to provide the capability for broadband FM television working with the ATS-F satellite.

(b) The training of engineers and technicians employed on and attached to the project in the design, operation and maintenance of all the equipment at the earth station related to the satellite television system.

(c) The design and development of television receivers for both community and direct reception of programme material broadcast from the satellite. The development of prototype receivers will be undertaken with a view to their subsequent manufacture in quantity in India. The manufacturing of the receivers will be the direct responsibility of the Government.

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ITU is providing a technical co-ordinator to undertake the over-all responsibility for ITU field activities in these areas. Expertise in the redesign and modification of the earth station is being provided by subcontract, and three additional ITU experts will be employed in the design and development of the television receivers.

The contribution of the Government of India to this project is of the order of \$US 9 million whilst the UNDP contribution amounts to \$US 1,069,820. It should be observed that this project is associated with other government/UNDP activities concerned with the development of television programme production and the utilization of the mass media for education. The United States National Aeronautics and Space Administration (NASA) is providing the satellite time for the experiment in accordance with the agreement signed on 18 September 1969.

ITU co-operation with UNESCO, in the field of tele-education, was continued and extended during 1972. During May and June an expert from ITU headquarters in Geneva accompanied a UNESCO team on a survey of tele-education requirements in a number of African countries. Field work was commenced on the feasibility study of a regional system of tele-education for the countries of South America in August. Four ITU experts are co-operating with a team of 18 UNESCO specialists in executing this study. The present phase is concerned with the accumulation of data on existing or planned facilities, and subsequent phases of the work will involve the determination of development requirements to meet the needs of each participating country. The study will be continued into 1973.

Progress had been made towards the development of a transportable earth station to provide communications from a disaster area to an international relief centre following a major catastrophe (see paragraphs 286 and 287 of the Review).

Early in 1972 the UNDP approved the allocation of \$US 50,000 for an interregional programme to permit ITU to develop specifications for an air transportable earth station. The specifications are required as a first step towards the development of the equipment and this project is in keeping with Recommendation Spa2-13 of the WARC for Space Telecommunications (1971).

A statement of the essential parameters of such an earth station was prepared by ITU, and tenders for the development of the specifications were invited, on an international basis, from companies and organizations active in research and development in this field. A number of competitive offers were received and studied and a contract was awarded for the development of detailed specifications.

After paragraph 295: insert

The eleventh report on telecommunications and the peaceful uses of outer space was issued in 1972, and the twelfth report is now under preparation prior to issue in mid-1973.

In accordance with the provisions of Resolution Spal, adopted by the Extraordinary Administrative Radio Conference to Allocate Frequency Bands for Space

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Radiocommunication Purposes (Geneva, 1963), the IFRB published in 1972, in a special section of its weekly circular, information consisting of a description of satellite systems from the following Administrations:

- (a) from the Italian Administration, the space research satellite system SIRIO;
- (b) from the Canadian Administration, the satellite telecommunication system CTS;
- (c) from the French Administration, a more detailed description of the experimental satellite telecommunication system Symphonie. This system was the subject of a concise description published in 1968 and of complementary information published in 1971;
- (d) from the Indian Administration, an experimental system of television by satellite by means of an ATS-F satellite.

In addition, ITU published in the "List of Stations in the Space Service and in the Radioastronomy Service", established by IFRB, all the characteristics of the earth stations and space stations which are inscribed in the Master International Frequency Register. The first and second recapitulative supplements to the third edition of this list were published in 1972.

After paragraph 299: insert

In this section, mention should be made of the symposium "Space and radiocommunications" organized by ITU every two years on the occasion of the Paris Air and Space Show. The first and second of these symposia took place in 1969 and 1971 and the third will be held on 28 May 1973 at Le Bourget, Paris. The theme of the symposium in 1973 will be "Space radiocommunications after the decisions of the 2nd World Administrative Conference for Space Telecommunications".

There has been a growing interest in these symposia, which have been organized in close co-operation with the French PTT Administration and have been sponsored by the Minister. Participants have included many international organizations and representatives of industry.

B. World Meteorological Organization (WMO)

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

Introductory remarks

1. Previous documents (see the Review, paragraphs 300 to 355 and A/AC.105/C.1/R.7, April 1972) have described WMO's major programmes which involve activities in the

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field of outer space. This report will be restricted to the significant events which have taken place since December 1971 and to certain uses of satellites in meteorological research programmes to be implemented in the near future.

World Weather Watch

2. Meteorological satellites continue to play a vital role in WMO's World Weather Watch (WWW) Programme. In the WWW plan, both near-polar orbiting and geostationary satellites form part of the integrated Global Observing System. In 1972 both types of satellite have continued to play important roles in the operational system.

3. Under the United States operational satellite system (TOS) initiated in 1966, meteorological satellites in the ESSA series were maintained in continuous operation. The ITOS system, which became fully operational with the launching of NOAA-1 at the end of 1970, continued to provide infra-red night-time cloud images, as well as sea-surface temperature data from cloud-free areas. A new satellite under this system, the first to carry the new type of APT transmissions (NOAA-2), was successfully launched in October 1972. Its transmissions have since been available to countries with suitably modified APT receivers. The original type of APT transmissions from ESSA 8 were still available at the end of 1972 and will continue until the satellite ceases to function; thereafter only the new system will be available from USA satellites. During the year, arrangements were made to ensure that SIRS data are received by all WMCs and RMCs on the Main Trunk Circuit of the GTS.

4. In the USSR the first meteorological satellite from which information was made available on an operational basis was launched in June 1966 and data from satellites of this system (Meteor system) have since been used regularly for operational purposes. During 1972 Meteor 6 and Meteor 10 have been in continuous operation. Data available include television and infra-red pictures of clouds, snow and ice cover, measurements of reflected and emitted radiation, and radiation temperatures of the earth's surface and of cloud tops.

5. In addition to the meteorological data from these satellite systems, considerable operational use has been made of data from experimental satellites. Temperature soundings derived from spectrometers on the NIMBUS III and IV satellites have been used at the WMC Washington for operational analyses and prognoses by numerical methods. Wind speeds and directions derived from measurements of cloud displacement have also been used operationally both in the USA and the USSR.

Planned meteorological satellites

6. The WWW plan for the period 1972-1975 clearly indicated that the goals for the satellite subsystem are to provide reasonable complete coverage of the world. This would require four geostationary satellites capable of taking cloud observations between about 50°N and 50°S at short time intervals, both by day and by night, and two to three near-polar orbiting meteorological satellites in continuous operation.

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7. Present plans provide for the launching of a number of geostationary meteorological satellites over the next few years. At the beginning of 1976 the European Space Research Organization (ESRO) plans to place a satellite (METEOSAT) above the equator between 00° and 20°E. At about the same time, a Japanese geostationary meteorological satellite (GMS) will be placed at approximately 120°E as a contribution to both WWW and the Tropical Cyclone Project. It will be equipped with a visible and infra-red scanning radiometer.

8. The United States is developing a Geostationary Operational Environmental Satellite (GOES) service to be inaugurated late in 1973. The first satellite in this system (SMS-A) will be located provisionally near 100°W. A two-channel radiometer on the satellite will provide near continuous imaging, day and night, over most of the North and South America and adjacent ocean areas. In addition, the satellite is designed to collect environmental data from remote observation platforms.

9. The USSR has announced its plans for setting up a geostationary meteorological satellite at approximately 70°E longitude.

10. A number of meetings of representatives of the countries and agencies concerned in geostationary meteorological satellite programmes were held in 1972 to ensure co-ordination of these activities.

Automatic Picture Transmission (APT) ground read-out stations

11. The WWW plan calls upon all WMO members to install at least one station in their territories for direct read-out of cloud images from satellites. Detailed information on existing and planned APT stations, as at 31 May 1972, is given in the Fifth Status Report. It shows that 204 stations are operated by approximately 100 different countries.

12. As already mentioned above, a new type of APT transmission was introduced by the USA with the launching of NOAA-2. Information regarding changes in the APT service provided by the USA meteorological satellite system has been distributed to all concerned. It included advice on the modifications necessary to current APT equipment to permit reception of transmissions from the new system.

Research satellites

13. With regard to research meteorological satellites, the United States successfully launched NIMBUS-5 in December 1972. This satellite carries six new experimental sensors, one of which is the microwave spectrometer. Thin clouds are relatively transparent in the microwave region, allowing this sensor to make vertical temperature and water vapour readings below most cloud layers. Clouds with high water content, which are usually associated with convective activity, can be easily identified by this sensor. Some of the USSR Cosmos series satellites also supply data of significant research interest to meteorologists.

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14. WMO is following with great interest the possibility of using satellites to monitor background air pollution (i.e. the pollution in the so-called "clean" air). These measurements would be extremely useful in complementing the ground-based measurements from WMO's Global Background Air Pollution Network.

The Global Atmospheric Research Programme (GARP)

GARP Atlantic Tropical Experiment (GATE)

15. The first experiment in a series of experiments under GARP will be the GARP Atlantic Tropical Experiment which is scheduled for summer 1974 in the area bounded approximately by the meridians 40°E and 90°W and the parallels 10°S and 20°N. A geostationary spacecraft positioned to view the GATE ocean area and polar orbiting spacecraft are essential for the conduct of the experiment. The main features of these satellites will be as follows:

(a) Polar-orbiting spacecraft

It is expected that spacecraft in both the USA "ITOS" series and the USSR "Meteor" series will be operational during GATE. In addition, it is probable that the USA Nimbus-E satellite, providing microwave and advanced infra-red sounders, will still be operating and that the NIMBUS-F satellite, carrying several experimental sensors of value to GATE, will be launched in June 1974. The ITOS and Meteor spacecraft should provide:

Vertical temperature soundings

Sea surface temperatures

Cloud mosaics with estimates of cloud-top heights for the entire tropics and mid-latitudes

APT backup to images obtained from the geostationary satellite

Direct broadcast to readout ground stations of the infra-red and visible channels of the very high resolution radiometer.

The NIMBUS-F spacecraft, if launched in time, will provide the following important data:

Wind, temperature, pressure and radio altitude at about the 150-mb level from monitored free-floating balloons

Temperature structure from the ground up to 40 km by the use of a high resolution infra-red sounder

Temperature profiles, water vapour abundance and cloud water content from a scanning microwave spectrometer

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Stratospheric temperature structure, water vapour and ozone density distributions by the use of a scanning infra-red radiometer.

Liquid water content of clouds from a scanning microwave radiometer

Incoming solar radiation, outgoing reflected solar radiation and emitted long-wave radiative fluxes.

(b) Geostationary spacecraft

It is anticipated that an "SMS" spacecraft will be launched by the USA and placed in a suitable longitude for viewing the GATE oceanic area. It will provide:

Frequent imaging of the Atlantic, by broadcast to the GATE Operational Control Centre for operational control purposes, the identification of areas of deep convection and the display of the internal features of cloud clusters, and for analysis especially wind determinations at the WMC Washington

Data collection from some GATE ships

Weather facsimile relay of analyses, prognostic charts, sea surface temperature maps, cloud-top mosaics and other processed satellite data from the WMC at Washington

Relay of data from wind dropsondes released from constant-level carrier balloons, if such balloons are operational.

First GARP Global Experiment (FGGE)

16. The next large experiment under GARP will be the First GARP Global Experiment which is scheduled to start in 1977. Two of the objectives of this experiment are to develop more powerful methods for using non-synchronous data, e.g. from satellites, in order to determine the initial conditions for predicting large scale motion, and to design an optimum meteorological observing system. The observing system proposed in order to meet the FGGE objectives includes two series of polar orbiting satellites, five geostationary satellites as well as experimental satellites. Satellites in near polar or geostationary orbits will provide convenient platforms for a variety of observing techniques, which fall into two main classes: (i) spectro-radiometric techniques for measuring the intensities of radiation in selected spectral regions for later interpretation in terms of meteorological parameters, and (ii) imaging techniques for mapping cloud cover or snow and ice cover in cloud free regions. The functions of these satellites as planned for the time of the FGGE will be as follows:

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(a) Polar orbiting spacecraft

Vertical temperature profiles will be derived from observations in the carbon-dioxide absorption bands. Pilot experiments have already been carried out on USSR satellites and more are being planned over the period 1972-1974 on United States satellites which will derive vertical profiles of temperature using oxygen absorption bands and microwave absorption

Water vapour profiles and total content will be inferred from measurements of radiation in the water vapour absorption bands; it is probably not possible to obtain more than three tropospheric layer averages

Sea surface temperature will be derivable from radiometric observations with a horizontal resolution of 2 km

Cloud top temperatures by measurement of the equivalent black body radiation

Cloud, snow and ice cover.

(b) Geostationary spacecraft

Routine wind derivation from sequential cloud images is seen as feasible for the mid-1970s

Recent studies have also shown that useful radiance measurements can be made for derivation of temperature profiles; the advantage of a sounder on a geostationary satellite is the time averaging that is possible, and the ability to observe one location continuously.

(c) Research satellites

It is expected that the USSR Cosmos series will continue to supply opportunities for meteorological experiments that would support FGGE. Even though the USA experimental meteorological satellite will terminate in 1974 experimental earth satellites will probably continue, and will afford some opportunities for experiments of a meteorological nature.

Co-operation with other organizations

The Joint UN/WMO Panel and Training Seminar on the Uses of Meteorological Satellite Data, Mexico City (November/December 1972)

17. This meeting was one of a series of WMO regional seminars which constitute an important ongoing programme of the World Meteorological Organization. The director and several of the instructors were able to benefit from experience gleaned from previous WMO seminars. In this particular panel specific attention was given to the tropical Latin America area. A considerable amount of visual aids, not only from meteorological satellite images but from Apollo and Gemini 70 mm colour photographs were collected and prepared for the panel by the

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instructors. These photographs, with better resolution than APT, are very useful for illustrating a variety of phenomena in the tropics. It is of interest to note that more relevant meteorological information can usually be seen when these photographs are deliberately put out of focus, thereby approximating APT resolution.

18. At the end of each afternoon, participants were able to analyse photographs from the NOAA-2 and ESSA-8 satellites which had been received that morning by APT. The conventional weather analysis charts were also available for these discussions. Participants were very interested in comparing the new SR system of NOAA-2 with the old vidicon camera system of ESSA-8. Working from current data is always more interesting than learning from past situations.

19. As meteorological satellites have provided the most useful source of remotely-sensed data from space, the World Meteorological Organization looks forward to organizing further joint meetings with the United Nations. It is hoped that a similar joint panel and training seminar can be held in Africa in 1974.

International Symposium on Meteorological Satellites

20. This symposium, co-sponsored by the United Nations and the World Meteorological Organization, is being organized by the French National Centre for Space Studies in co-operation with the French National Meteorological Service and the Dynamic Meteorology Laboratory of the French National Centre for Scientific Research. It will be held in Paris from 21-24 May 1973.

21. The symposium is intended primarily for meteorologists and users of meteorological data. Its aims are to achieve a better understanding of the applications of space techniques to meteorological problems.

22. The main topics for discussion during the symposium are:

The state of the art of space meteorology in 1973

Evolution of space meteorology (1973-1980)

Outlook for space meteorology (beyond 1980)

23. A paper describing the applications of meteorological satellites within the WMO World Weather Watch and Global Atmospheric Research Programmes will be presented at the symposium.

WMO/WHO Technical Conference on Observation and Measurement of Atmospheric Pollution (TECOMAP)

24. This conference will be held in Helsinki from 30 July to 4 August 1973. Several papers on remote sensing of the atmosphere will be submitted to the

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conference. The conference will be followed by the sixth session of WMO's Commissions for Instruments and Methods of Observation and Atmospheric Sciences which will also consider carefully the roles they should play in this important new facet of space technology.

Publications and documentation

25. The following publications contained references to satellite meteorology:

GARP Publications Series

- No. 8 Parameterization of Sub-Grid Scale Processes
- No. 9 The Basic Data Set Project
- No. 10 Methods for the Approximate Solution of Time Dependent Problems
- No. 11 The First GARP Global Experiment - Objectives and Plans

GARP Special Reports

- No. 5 Report of the Second Session of the Tropical Experiment Board - Geneva, December 1971
- No. 6 Report of the Third Session of the Tropical Experiment Board - Geneva, April 1972
- No. 7 Report of the Second Session of the Tropical Experiment Council - Geneva, September 1972
- No. 8 Report of the Planning Conference on the First GARP Global Experiment - Geneva, September 1972
- No. 9 Report of the Fourth Session of the Tropical Experiment Board - Geneva, March 1973

GARP/JOC Reports

- Report of the Seventh Session of the JOC - Munich, June 1972
- Report of the Eighth Session of the JOC - London, March 1973

WMO Bulletin

- Vol. XXI, No. 1, p. 28 - Global Atmospheric Research Programme
- Vol. XXI, No. 2, p. 84 - Global Atmospheric Research Programme

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- Vol. XXI, No. 3, p. 163 - Global Atmospheric Research Programme
- Vol. XXI, No. 4, p. 232 - Global Atmospheric Research Programme
- Vol. XXII, No. 1, p. 7 - Some Results of Investigations under the Programme of the Complex Energetic Experiment (1970-72)
- Vol. XXII, No. 2, p. 47 - Global Atmospheric Research Programme

World Weather Watch

WMO - No. 334 - Fifth Status Report on Implementation

Annex

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

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

For paragraph 358 substitute

358. Within the organization, the Division of Communication Research and Planning, within the Department of Free Flow and Development and Application of Communication, assumes responsibility for the space communication programme. The promotion of international arrangements and conventions is carried out in close co-operation with the Office of International Norms and Legal Affairs. Assistance to member States, principally in the form of missions to provide expert advice on the use of space communication for education and national development, is carried out with the assistance of the Division of Methods, Materials and Techniques, part of the Department of Curriculum, Structure and Methods.

After paragraph 383 insert

A meeting of experts was held at UNESCO headquarters from 23 to 26 May 1972 to examine the draft of 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.

The resulting text was approved, with one amendment, at the seventeenth General Conference of UNESCO, held in October/November 1972.

At the invitation of the Governments of Nigeria and Senegal, an expert mission was carried out in May 1972, in co-operation with the International Telecommunication Union, to make a preliminary study of a regional satellite system for education, culture and development in Africa south of the Sahara.

In November/December 1972 an expert visited several Arab States to discuss the findings and recommendations of the 1970 mission report and to have further consultations on the possibilities and precise objectives of a co-operative regional satellite system for the Arab States.

Work continued during this year on a long-range feasibility study of a regional system of tele-education for the countries of South America. Under this UNDP project, for which UNESCO is the executing agency in association with ITU, a large mission commenced the field phase of the study in August, visiting Argentina, Bolivia, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela. The field phase of the mission will be concluded and the report prepared during 1973.

Contact is being maintained with Indian authorities concerning the satellite instructional television experiment (SITE) foreseen in 1975. In this context, UNESCO participated in a seminar in December, organized by the United Nations in India on the application of space technology for education and development.

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The following activities have been undertaken in the Science Sector:

UNESCO and the International Geographical Union collaborated in holding a symposium on geographical data sensing, processing and retrieval (the UNESCO/IGU Second Symposium on Geographical Information Systems) in Ottawa, Canada, in August 1972. Special attention was given to the problems of gathering environmental data, including the utilization of various remote sensing techniques, as well as processing of data collected by remote sensors. A set of working papers was prepared to provide conference documentation for participants in the symposium.

Consultant services and equipment for remote sensing have been provided to the Laboratory of Dynamics of the Great Masses of Venice charged with the scientific aspects of the Venice campaign. Feasibility studies are continuing for the use of colour, infra-red photography and infra-red scanning for flow and waste disposal studies in the Venice lagoon. Remote sensing techniques and airborne sensing devices over the Adriatic are and will be used for high water forecast in the Venice area. The possibilities are being studied of using EROS-provided photographs for environmental studies in the area.

With the co-operation of appropriate working groups of the Co-ordinating Council of the International Hydrological Decade and of the International Association of Hydrological Sciences, UNESCO is developing remote sensing methodology for hydrological purposes, including measurement of snow-cover, floods, and sediment transport. A report on "Hydrological information systems", summarizing international developments of systems for acquisition, transmission, storage and processing of hydrological data, has been published. A manual on aerial methods of floor survey is in preparation.

The joint IOG/WMO Group of Experts on IGOSS technical systems design and development and service requirements (ITECU) is preparing a report on potential uses of satellites and aircraft observations in oceanography in view of their potential contribution to the IGOSS (Integrated Global Ocean Station System) programme.

The use of communication satellites for collection and relay and dissemination of ocean observations is one of the tasks to be studied by the Joint IOC/WMO Group on Telecommunication.

After paragraph 388 insert

In the series of Reports and Papers on Mass Communication, No. 66, "A Guide to Satellite Communication", was published. This booklet, produced in co-operation with ITU, responded to a request from the United Nations Committee on the Peaceful Uses of Outer Space for a survey, in non-technical terms, on the characteristics and uses of communication satellites.

A bibliography of material published by the United Nations on the use of space communication in UNESCO's fields of competence was prepared for publication.

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

The following text has been submitted to bring up to date the section on FAO (paragraphs 389-404 of the Review).

Organizational responsibility

1. The primary responsibility for the co-ordination of FAO's activities in the field of remote sensing and the international space co-operation continues to rest with the office of the Assistant Director-General, Agriculture Department, to which an expert in remote sensing has been attached.

Current programmes and activities in the field of space technology

2. Anti-locust work described in paragraph 396 has been continued during the year. High flying operations (see para. 395) are being used to locate areas of recent rainfall and green ephemeral vegetation, ecologically suited to locust habitats, while low-level aerial photography is being carried out experimentally to detect the locusts.
3. With regard to the Soil Map of the World project (see para. 395), it is felt that the ERTS-A and ERTS-B imagery will be valuable in interpreting the Soil Map of the World for evaluation of available land resources and a global study and monitoring of land degradation. This is an ongoing project and will continue.
4. In the area of land and water surveys, extensive use of remote sensing information from low as well as high altitude has been made and will continue to be made in conducting land and water resource surveys, particularly through the field programmes. Requests for ERTS-A and ERTS-B imagery have been submitted for several land-use, water resource and soil inventory projects.
5. In fisheries, FAO is keeping under steady review the development of applications of remote sensing from aircraft and satellites to the study of oceanographic features having influence on the distribution and abundance of fisheries resources, and especially to the use of aircraft in locating fish concentrations and guiding fishing fleets in their operations. Application of such techniques is sometimes included in FAO fisheries research and development projects.
6. Under the FAO programme of work and budget, 1974-1975, the small ad hoc consultation on remote sensing and utilization of information mentioned in paragraph 398 (i) of the Review may be convened during the biennium 1974-1975, in collaboration with the United Nations, as a follow-up of the 1971 consultation, to review case histories and the opportunities for remote sensing techniques.
7. With respect to future activities in locust control (see para. 398 (iii)), it is planned to extend the satellite imagery investigations to the monitoring of ERTS-B imagery covering seven Saharan countries of northern Africa.

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8. On foreseeable uses of remote sensing from space vehicles for purposes of forest resources surveys (see para. 398 (vi)), two projects would benefit in particular, namely:

(a) the World Forest Inventory, carried out on a continuous basis by the FAO Forestry Department, which aims at estimating the forest resources per country (forest areas per type, ownership, quality, growing stocks and eventually yields) and which has until now only been using information gathered through questionnaires and reports;

(b) a world tropical forest cover monitoring project which will be proposed to the United Nations Environment Fund as a follow-up activity of the Stockholm Conference on the Human Environment, with reference to its recommendation 25 on a world forest appraisal.

Application of remote sensing to forest resource surveys will be dealt with in two training courses on forest inventory which are scheduled for 1974 for the tropical Africa region (English-speaking countries) and for 1975 for the Latin America region.

9. Further to the information given in paragraph 398 (vii) of the Review, the use of satellite and high flying aircraft for the collection of oceanographic data needs intercalibration of remote sensor observation with the ground truth data. The existing UNDP/Special Fund projects aiming at the development of fishery will provide a good opportunity for ground data experiments. Such experiments, in the beginning, will be made with only one UNDP/Special Fund project, possibly within the framework of co-operative investigation of the northern part of eastern central Atlantic (CINECA), which is organized by FAO in co-operation with the International Council for the Exploration of the Sea (ICES). Ground data can be checked not only by an FAO research vessel (Laurent Amaro) operating in Senegalese waters but also by a number of research vessels of, at least, 10 nations, participating in the CINECA operation. If these experiments succeed, the co-operation between satellites data centres and other UNDP/Special Fund projects will be extended.

10. Subject to the availability of funds which might be allocated specially for this purpose, the FAO Fisheries Department intends to establish a short-term or consultant post (3 to 6 months) to up-date the review on the application of airborne remote sensing to fishery research and development and to fishery operations. This officer will also develop long-range programmes for educating and training local personnel in field projects in the same measure as the remote sensor observations can be applicable to these countries. This programme will be developed in close liaison with various country agencies responsible for the technical operation of the aerospace projects.

11. In the field of global satellite remote sensing, it is proposed, subject to the availability of funds, to initiate a global project on marginal lands. Phase I (1974/75) covers the Saharan zone of Africa.

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12. In addition to the material mentioned in paragraphs 395 and 400 of the Review, a report entitled "Satellite Sensing of Land Resources" was prepared for the 13th International Technical Scientific Meeting on Space (Rome 1973).

Other relevant information

13. FAO has submitted to NASA, Washington, three proposals for the SKYLAB and 15 proposals for the ERTS-B programmes.

F. International Civil Aviation Organization (ICAO)

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

Paragraph 416: for the first sentence substitute

ICAO's interest in space affairs, like all other interests of this organization of 124 Governments, are governed by its primary organ - the Assembly - which normally meets once in three years.

For paragraph 429 substitute

A fifth meeting of the ASTRA Panel was held in January 1972 and was largely devoted to the preparation of a substantial working paper on the use of satellites for aeronautical purposes, which was subsequently submitted to the ICAO Seventh Air Navigation Conference. That Conference, held in April 1972, was the first occasion when the subject of aeronautical satellites was considered in depth by an ICAO world-wide meeting. The report of the Conference outlines in considerable detail a programme of evaluation and development which could be followed by an operational proving phase around 1980.

For paragraph 433 substitute

The ASTRA Panel has so far met on five occasions. The report of the third meeting was published in 1970 as ICAO document 8873 in English, French and Spanish, and is available to all interested parties. That document contains in its appendices the more significant elements of the reports related to the Panel's first and second meetings. The report of the Panel's fourth meeting was reviewed by the Air Navigation Commission in February 1971 and it too is available as an ICAO saleable document 8929 in English, French and Spanish - price \$US 1.50. The report of the fifth meeting of the ASTRA Panel has not been published as a separate document since in essence it became a working paper of the ICAO Seventh Air Navigation Conference. The report of that conference is ICAO Doc. 9004 AN-CONF/7, which is available for \$US 5.00 in English, French, Russian and Spanish.

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G. Inter-Governmental Maritime Consultative Organization (IMCO)

The following text has been submitted to bring up to date the section on IMCO (paragraphs 434-442 of the Review).

(a) Current activities relating to the utilization of space technology

(i) Preparation for the World Administrative Radio Conference for Space Telecommunications

1. Since 1966 IMCO has taken a considerable interest in the development of space techniques for maritime purposes although so far IMCO's activities in the utilization of space techniques have been largely related to the development of maritime requirements in preparation for the World Administrative Radio Conference for Space Telecommunications, held in June 1971. The technical bodies of IMCO have prepared two recommendations (MSC XXII/22, annex XI and COM VIII/9, annex II) presenting a concerted viewpoint of the maritime requirements. These were communicated to all member Governments to assist them in formulating their national positions for the Conference.

2. Among other things, the IMCO recommendations specified that space techniques could be used for alerting and locating ships in cases of distress and emergency, for facilitating search and rescue operations through more effective communications and for the promulgation of urgency and safety messages. Ancillary functions could be the automation of a position-reporting system, position determination and information, traffic guidance, automatic navigational warning system, weather routing direct printing and facsimile.

3. The general outline that emerged therefore at that stage envisaged that a Maritime Satellite System ought to satisfy primarily telecommunication requirements (safety, distress and public correspondence) and in addition to perform a number of other functions which had to be determined on a priority basis and according to their merit and had to be compatible and consistent with the optimum use of the frequency spectrum available and the organizational and financial factors involved in the development and eventual operation of the system.

(ii) Organizational plan for an international maritime satellite system

4. The results of the Space Conference did not give full recognition to the maritime requirements and the need for promoting safety at sea. However, they constituted a step in the right direction and, subsequent to the allocation of frequencies to the maritime mobile service for the use of space techniques, it was necessary to study the practical problems relating to the development and implementation of an operational maritime satellite system. It was decided that IMCO should prepare an organizational plan for an international maritime satellite system in full co-operation with the telecommunication authorities of its member Governments. The ultimate aim should be the development of a formal agreement for the establishment and operation of a maritime satellite system.

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The plan should, among other things,

(a) Provide standardized procedures to the maximum possible extent;

(b) Provide for the highest practical degree of compatibility between independent systems established by Governments, organizations and other bodies;

(c) Take into consideration the responsibility of ITU.

6. In March 1972 the Maritime Safety Committee, recognizing the urgency and the need to continue the work in a manner which could lead to an early implementation of a maritime satellite system, established a Panel of Experts which should give priority consideration to the following subjects:

(i) Study of the operational requirements of a maritime mobile satellite system;

(ii) Study of the essential characteristics of a maritime mobile satellite system;

(iii) Study of critical system elements, for example, ship terminal;

(iv) Cost/benefit and marketing studies leading to a cost evaluation;

(v) Preparation of recommendations for a programme of experiments and development work that may be necessary;

(vi) The appropriate body or bodies which might be interested in financing, establishing and operating the system;

(vii) Preparation of a report for the first meeting of the proposed International Conference of Governments in 1974.

7. It has been agreed so far that the main reasons for requiring a maritime satellite system as soon as possible are:

(a) To relieve present congestion in the MF and HF bands;

(b) To improve reliability, quality and speed of communication;

(c) To improve geographical coverage;

(d) To provide more reliable circuits and permit automation of telephone and radioteleprinter;

(e) To cater for services not now possible in the MF and HF bands, e.g. high-speed data transmission;

(f) To provide for radio-determination;

(g) To improve the safety and distress services.

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8. It is envisaged that from the outset the system would be capable of expansion with the greatest possible flexibility in its space segment, whereas the shipborne terminals should, to the greatest possible extent, not have to be replaced in the switchover from one phase to another. The possibility for expansion should be primarily directed towards the quantitative capacity of the system, with the need to include additional functions at a later stage being also borne in mind.

9. The ultimate aim of the system should be to include services such as distress, safety, radio-determination, communication, surveillance and data transmission in accordance with the provisions contained in the appropriate IMCO documents. Accordingly, detailed operational requirements in these services will have to be determined and international agreement will be needed on the basic system characteristics.

10. A provisional time-table was prepared including the gradual steps for the completion of the study and implementation of the system.

(b) Future programme and activities

11. One of the problems which has to be studied is the appropriate body or bodies which might be interested in financing, establishing and operating the system. In this connexion consideration should be given to the use of existing organizations and the part which IMCO might play in this respect. The following areas of responsibility for a future satellite organization were mentioned:

- (i) further development of the system;
- (ii) development of satellites;
- (iii) launching of satellites;
- (iv) the operation of the system;
- (v) replacement of satellites;
- (vi) commercial and financial aspects.

12. At its first two sessions (July 1972 and November 1972) the Panel of Experts on Maritime Satellites defined more precisely the operational requirements and priorities and gave consideration to the formulation of basic guidelines and essential characteristics for the first phase of the system.

13. The Panel will hold its next sessions in London in May 1973 and in Paris in September 1973 when, among other things, consideration will be given to the preparatory work for the proposed International Conference of Governments in 1974.

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(c) Co-operation with specialized agencies and other organizations

14. In the development of this study IMCO is closely co-operating with the United Nations and other specialized agencies. Their expertise and assistance is appreciated and is also necessary because certain aspects of the issues involved are under the responsibility of, for example, ITU, ICAO, or WMO. Many non-governmental international organizations representing shipowners' associations, trade unions and other interests and bodies concerned primarily with shipping matters and having consultative status with IMCO, have contributed and will continue to play a valuable part in assisting IMCO with its work on this subject. In the deliberations of the technical bodies of IMCO, representatives and observers from 17 international organizations participated when the use of space radio techniques and associated problems were discussed. It is expected that the same assistance and co-operation will be available at the future stages of the study.

H. International Labour Organisation (ILO)

The following text has been submitted to bring up to date the section on ILO (paragraphs 443-449 of the Review).

1. Outer space activities and related ground-based operations involve specific hazards to life and health the prevention of which is obviously essential. The preparation of outer space activities involves the participation of a large number of industries with considerable manpower. These industries, which are either traditional (building and civil engineering, mechanical, electrical and electronic engineering, chemistry, etc.) or involve advanced technology, present innumerable potential occupational hazards which have to be controlled through legislative, administrative and technical measures. This is a field in which the ILO has a long established experience, and in which it is intending to continue and increase its activities in particular through the preparation of international standards (Conventions and Recommendations), technical standards (e.g. codes of practice), and technical manuals, the collection and dissemination of information, the organization of congresses and symposia, and technical co-operation with developing countries.

2. A specific feature of manned outer space activities carried out so far is the outstanding attention devoted to the safe design of the equipment and to the safety of the operations in flight, the reason being in particular that no rescue operations have so far been possible in space. No other branches of activity, with the possible exception of nuclear operations for peaceful uses, have embodied an equivalent degree of safety. Outer space activities have set the standard for the highest attainable levels of safety in technological achievements. The approaches and methods involved are now studied with a view to applying them to traditional activities with severe potential occupational hazards in particular. The ILO is closely following these developments and is prepared to promote their application.

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3. The use of outer space for direct or relayed transmission of television programmes embodies an immense potential for raising the awareness towards safety and health at work, and in all walks of life in general, among the general population in developing countries in particular. Satisfactory levels of occupational safety and health can only be achieved through the direct involvement of Governments, employers and workers alike. A nation-wide programme, for the benefit of workers in particular, providing information and basic training in the prevention of occupational accidents and diseases may best be carried out through television networks.

4. Outer space activities and related ground-based operations have affected and presumably will continue to affect numerous aspects of human resources development, a field in which the ILO has established experience in both developed and developing countries. While training and retraining in the industrial sectors, related to outer space activities, come to mind most readily and have been emphasized in past documents (A/AC.105/100), this statement draws attention to other fields of human resources development, existing in all economic sectors, affected by outer space activities. These fields, in addition to training and retraining in the industrial sectors, include other components of vocational preparation (skill formation in non-industrial sectors, organization and implementation of training systems per se, and vocational and career orientation), social aspects of human resources development and management methods and systems, including management information systems.

5. In the field of training, retraining and vocational preparation, existing ILO programmes to build skills in the installation, maintenance and repair of equipment can be expanded to include outer space and related ground equipment and services. Given the important role of computers in the operation of space-related equipment and in the processing of information provided by this equipment, ILO training programmes in computer programming and operations have been opportune and will continue to be relevant to the peaceful uses of outer space. The ILO foresees that as space activities become more prevalent, accompanied by new types of jobs, shifts in emphasis in jobs or the elimination of some work, it may become necessary to create, adapt and even abolish certain training systems. The application of remote sensing in rural and agricultural fields, such as land surveys, forestry and fishery, for example, may require that some vocational training programmes and managerial techniques, which heretofore have been extended only to urban and/or industrial based peoples, be provided to rural workers.

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

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

7. Some social aspects of human resources development in relation to outer space activities are mentioned here in terms of possible problems that may arise for which safeguards should be considered. First, efforts will have to be made to ensure that sophisticated transmission techniques do not restrict the availability of the programmes for those who need the training the most. Second, if outer space is to be used for training and vocational orientation, then care will have to be exercised in the choice of the subject-matter, the level of skill and/or knowledge required to benefit from the programmes, the relevancy of the programmes to diverse cultural and economic settings and the possible effects the programmes could have on the viewers in terms of expectations, mobility and their sense of commitment to maximize the benefits of a training programme. Third, development of mass communication training techniques should supplement and update and not replace more traditional forms of training especially until effective methods are found to communicate trainee/student feedback and to replace the benefits of on-the-job training. Similarly, Governments, employers' and workers' organizations and others responsible for managing people should ensure that workers and staff training programmes keep pace with the development of training and vocational orientation facilities, and that their responsibilities for staff development are not lessened because of the availability of other programmes.

8. The changes in management methods and systems due to outer space transmission and information-gathering processes will probably have a considerable impact on management development methods. These changes will, in turn, certainly affect the content of management training programmes and the skill requirements of trainers, trainees and existing managers.

I. International Atomic Energy Agency (IAEA)

The following text has been submitted to bring up to date the section on IAEA (paragraphs 450-459 of the Review):

(a) Organizational responsibilities

The IAEA divisions responsible for activities relating to the peaceful uses of outer space are the Legal Division; Division of Nuclear Power and Reactors; Division of Nuclear Safety and Environmental Protection, and Division of Research and Laboratories.

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(b) Current and future programmes and activities

The IAEA continues to be interested in the legal, environmental and technical problems which have a bearing on its activities liable to arise in connexion with the peaceful use of outer space.

The IAEA will continue to follow the work of the Committee on the Peaceful Uses of Outer Space, particularly that of its Legal Sub-Committee in its deliberations touching upon problems of concern to the Agency.

In order to keep abreast with current developments in the work of the Legal Sub-Committee, the IAEA has been represented at a number of its meetings and receives the records of those meetings which it is unable to attend.

Although the IAEA has not recently been involved in scientific and technical activities directly related to the peaceful uses of outer space, indirect connexions with space affairs exist in the form of Agency interest in unconventional energy conversion systems, such as those employing thermionic and magnetohydrodynamic processes, which are, or are likely to be, involved in propulsion and space power systems. A number of scientific meetings on these subjects has been held and some are being planned for the future.

The basic Agency programmes in the biological effects of radiation and radiation safety may also be extended in future to include space environmental problems. The Agency would have a close interest in all measures for preventing any unacceptable radio-active contamination of the earth's atmosphere resulting from the use of nuclear or radioisotopic power generators for space vehicles.

(c) Co-operation with other organizations

The IAEA co-operates with OECD (NEA) in the field of magnetohydrodynamics and thermionic processes in the form of joint liaison groups. A comprehensive Status Report on Magnetohydrodynamic Electrical Power Generation was prepared by the International MHD Liaison Group and published in the Agency's Atomic Energy Review Journal in 1972.

Arrangements have been made whereby the Agency is to receive relevant information regarding the work of the United Nations Committee on the Peaceful Uses of Outer Space.

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III. OTHER INTERGOVERNMENTAL ORGANIZATIONS

A. European Space Vehicle Launcher Development Organization (ELDO)

The following text has been submitted to bring up to date the section on ELDO (paragraphs 460-502 of the Review).

For paragraph 464 substitute

The secretariat is situated at the headquarters of the organization, Neuilly-sur-Seine near Paris, under the leadership of the Secretary-General, General R. Aubinière who took over from the former Secretary-General, Ambassador R. di Carrobbio on 1 January 1972. As from early 1972 the Technical Director is Mr. H. Hoffmann and the Administrative Director is Mr. G. Van Reeth.

At the end of paragraph 471, for subparagraph (iii) substitute

(iii) Launch of F12, planned for mid-1973;

(iv) Launch of F13, planned for end-1973.

Delete paragraph 472

For paragraph 474 substitute

The F11 launching in early November 1971, which was the first firing of the Europa II vehicle, failed in flight. The ELDO Council, at its fifty-third session on 18 November 1971, set up a Project Review Commission consisting of experts from the Member States assisted by the Secretariat to examine the technical aspects of the project as well as the present management arrangements. The cause of the failure was identified as electrostatic effects having their origin in the charging of the fairings during the first part of the flight. Modifications were proposed and have been incorporated to remedy the defect and to meet the requirements of a thorough review of the design.

For paragraphs 481-485 substitute

Preparation of the Europa III project began on 15 April 1969, when the ELDO Ministerial Conference decided to undertake the definition phase of a launcher capable of placing about 750 kg in geostationary orbit. The European Space Conference, at its meeting in Brussels on 20 December 1972, decided to terminate the project.

During 1972 the offer by NASA of European participation in the post-Apollo programme was restricted to the Sortie Module. European work on the space tug, sponsored by ELDO, was therefore terminated.

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After paragraph 486 insert

Denmark and Switzerland, which have observer status, continued to display their interest in the work of ELDO by attending meetings of the Council.

For paragraphs 487 and 488 substitute

Relations between ELDO and NASA have existed since the creation of the organization and have developed ever since. The Space Documentation Service in which ELDO and ESRO collaborate and which makes use of materials supplied by NASA is referred to below (see paragraph 501 of the Review).

For paragraph 490 substitute

490. Co-operation with ESRO is close and the two organizations maintain constant touch over problems which concern them both, for example, on the use of Europa II to launch the COS-B satellite.

After paragraph 493 insert

Members of the Committee of Science and Technology of the Council of Europe were invited by the organization to visit the base at Kourou in French Guiana in February 1971.

After paragraph 494 insert

Members of the Western European Union Assembly were invited to visit the Kourou base in February 1971.

B. European Space Research Organisation (ESRO)

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

(a) Introduction

The historical background of the European Space Research Organisation, its internal structure and facilities, are outlined in the 1972 edition of the Review (Space Activities and Resources). At the time of publication, however, the organization had just completed a detailed review of its modus operandi, and vital decisions arising from this review had been taken by the Council in December 1971. The review was carried out primarily to prepare for extension of the organization's activities to the applications satellite field and to provide greater flexibility for the execution of its programmes. It seems advisable, therefore, in order to provide a clearer understanding of what follows, to summarize briefly the major effects of the December 1971 decisions and of any taken subsequently.

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In virtually all fields of science and technology, major decisions on the undertaking of projects hinge upon the problem of finance, and the ESRO decisions of December 1971 were no exception. Previously, all 10 member States of the organization had contributed towards its financing in proportion to their GNP; even with a programme limited to science only, this clearly imposed a financial strain on certain of the Member States that were not so well-endowed financially. Nevertheless, a viable scientific programme had been possible.

During the late 1960s, it became clear that Europe must soon enter the newly emerging field of application satellites, but the vital problem was how this could be done with the limited financial resources available. The major decisions to be taken were how these resources could be apportioned to science and applications and how the conflicting interests of Member States with regard to the various possible application projects could be brought together. Suffice it to say that, after long study, it was decided that the organization should in future pursue a scientific programme (considerably reduced in magnitude) and a programme of basic activities (applied research, feasibility studies, certain common costs, etc.), both of which would be financially supported by all member States, whereas participation in the various application programmes would be optional. The success of this solution is evidenced by the fact that of the three application programmes currently in progress, one is financed by all 10 member States and the other two by eight. Further details of the reduction in the scientific programme and of the current state of the programmes in science and applications are given in sections (b) and (c).

Other decisions taken in December 1971 were that the organization's role in the co-ordination of European space programmes, including those originating within national agencies, should be greatly enhanced, and also that a major revision of the 1964 Convention was necessary to formalize the new programme concept. This revision was completed in 1972 but is not yet formally in force.

In the establishment of the new programme concept, it was clear that the old committee structure of the organization was no longer applicable. Of the major committees previously in existence, the Council has, of course, been retained, as has the Administrative and Finance Committee. To cope with the greatly increased operational programme however, it was decided to abolish the former Scientific and Technical Committee and the Interim Applications Programme Committee (set up in the early stages of the applications programme), and to replace them by Programme Boards, one each for the Scientific, Aeronautical, Meteorological and Telecommunication Programmes. In addition, a Joint Programme and Policy Committee was established to deal, inter alia, with the basic activities part of the organization's programme, all matters common to the various scientific and application projects, and the co-ordination of programmes carried out by the organization and member States.

To conclude this Introduction, mention must be made of a vital decision reached by the Ministerial Meeting of the European Space Conference in December 1972. During 1971 and 1972, both ESRO and ELDO had taken part, in close co-operation with NASA, in various studies on the proposed post-Apollo programme, particularly on those

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parts where it was felt that Europe was in a position, both technically and financially, to make a useful contribution. As these preliminary studies approached their final stages, however, the United States authorities gradually reduced the number of areas in which it was prepared to accept European participation. In the end, only one possibility remained - the Sortie Lab. Because of the conflicting interests and priorities of the various European countries with regard to participation in post-Apollo and the development of an independent European launcher, it was clear that decisions in these matters could not be made by ESRO and ELDO alone, but by agreement between the responsible Ministers in the interested countries, i.e. by the European Space Conference. At its meeting on 20 December 1972, the ESC gave its approval for the Sortie Lab project to be carried out by ESRO - see section (d). Decisions taken on the European launcher programme can be found in the ELDO section of this publication. The ESC also decided that a new organization (the European Space Agency) will be formed out of ELDO and ESRO (if possible by 1 January 1974), and that European national programmes should be integrated into a European space programme as far and as fast as reasonably possible. It is too early, as yet, to foresee the precise implications of these latter decisions.

(b) Scientific programme

The scientific programme, both current and future, was considerably affected by decisions made by the Council in December 1971 in preparing for the extension of the organization's activities to the applications field. The reduction in the level of resources allocated to the scientific programme had its major impact in the fields of sounding rockets and basic scientific research, whilst it was also necessary to effect a slight deceleration in the scientific satellite programme.

In implementation of the above decisions, the organization's sounding-rocket programme was brought to a close, and the range at Kiruna (ESRANGE) was taken over by the Swedish authorities as from 1 July 1972. The special sounding-rocket project, whereby member States continue to make use of ESRANGE and the nearby range at Andøya (Norway), but under which they are themselves responsible for payload integration and supply of rockets, came into operation in October 1972, and 16 rockets were launched in this project by the end of the year.

Preparations for the termination of the basic scientific research programme at ESRIN (Frascati) by mid-1973 went ahead in 1972, with the completion of certain experiments, the takeover of three major experiments by other scientific institutes and the gradual running down of the remainder. Part of the buildings and facilities at ESRIN will be taken over by the Italian National Research Council and part by the ESRO Space Documentation Service, which will be transferred to Frascati from the Paris Office in April 1973.

The scientific satellite programme continued more or less as planned during 1972, apart from the slight slowing down referred to earlier. It was indeed a highly rewarding year for the organization from the launch aspect in that three satellites were successfully launched, to bring the total launch figure to seven.

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HEOS-A2, carrying seven experiments for the investigation of interplanetary space and of the high-latitude magnetosphere and its boundary, was launched from the Western Test Range, California, on 31 January 1972, and at the time of writing (February 1973) is still in orbit and transmitting valuable scientific data, as indeed is its predecessor, HEOS-1, launched in December 1968.

The TD-1A astronomical satellite, Europe's largest to date, was successfully launched from the Western Test Range on 12 March 1972. It carries four experiments for study of the emission from stars and other galactic and extragalactic sources, two for the measurement of solar emission, and one for the study of primary particles. Unfortunately, the somewhat premature failure of the tape recorders reduced the mission to a "real-time only" operation. However, with all other subsystems and experiments operating satisfactorily, speedy action was taken to increase the real-time coverage by obtaining the support of numerous additional ground stations and the setting up of temporary stations; this boosted the coverage from below 30 per cent to more than 60 per cent, and early scientific results are highly encouraging. The satellite went into eclipse in November 1972, and operations are now in hand to prepare the satellite for a second operational lifetime when it again emerges into full sunlight in February 1973.

The third 1972 launch was that of the ESRO-IV satellite, on 21 November. The five scientific experiments on board were designed for the study of the ionosphere, the near magnetosphere and auroral and solar particles. Launch was completely successful and all subsystems and experiments are functioning satisfactorily.

The current scientific satellite programme includes the following projects:

- (i) COS-B, which will carry a single, complex experiment for studying the origin and energy spectrum of the flux of gamma rays coming from the cosmos. Following earlier feasibility and definition studies, the main development contract was placed early in 1972, with a scheduled launch date of February 1975.
- (ii) GEOS, a geostationary satellite carrying nine experiments for the study of particles flux, electric and magnetic fields, and electromagnetic waves in the far magnetosphere. Competitive definition studies were completed by industry in September 1972, and work on the detailed definition study is at present in progress by the successful consortium. This is due for completion in March 1973 and should lead to the start of the development phase during the following month.
- (iii) International Ultraviolet Explore (IUE) Satellite (previously known as SAS-D). This is fundamentally a joint United States/United Kingdom project, and approval for ESRO participation was given by the Council in December 1971. ESRO's share of the project comprises the provision of the solar array and the setting up of a European ground station, in return for which European astronomers will be allocated a percentage of the available observing time.

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In addition to the above three projects, preliminary studies in preparation for choice of the next scientific satellite projects are in their final stages. These studies include a High-Eccentricity Lunar Occultation X-Ray Satellite (HELOS), a Venus Orbiter, and the IMP Mother/Daughter (and Heliocentric) mission. A decision as to which project will be selected is expected to be made in the first half of 1973.

(c) Applications programme

The current programme in applications satellites also stems primarily from the decisions made by the Council in December 1971, although a considerable amount of preparatory work, particularly in the telecommunications field, had been carried out before that date. Three applications programmes are at present under way:

- (i) An aeronautical satellite programme (air traffic control). At the end of 1971, plans for a "Joint Aerosat Programme" had reached the stage where a Memorandum of Understanding (MOU) had been prepared for signature early in 1972 by ESRO, acting on behalf of the participating European countries, the United States Federal Aviation Administration (FAA), Australia, Canada and Japan. However, the United States authorities decided that the MOU was not acceptable in its then existing form. After a delay of several months, with no alternative proposals forthcoming from the United States, ESRO decided to go ahead with pre-development work on the payload by European industry. Towards the end of 1972, however, certain sectors of American industry, with the approval of the United States authorities, showed interest in collaborating with ESRO in a joint programme and in November of that year, ESRO announced that it planned to select an American industrial partner to co-finance the development of the space segment, and to enter into an agreement with United States and other interested international aeronautical authorities covering utilization of the proposed system. Requests for proposals have been sent to the five United States companies that notified ESRO of their interest in collaboration, and it is anticipated that choice of a partner for ESRO will be made in April 1973. In parallel with the above, negotiations on a revised MOU on a joint programme of experimentation and evaluation using an aeronautical satellite system are under discussion with the four countries named above.
- (ii) A meteorological satellite programme. This is based on the Meteosat concept, a geostationary meteorological satellite that had been under study by France for about 18 months before the decision to proceed with it as a European project. The programme will be carried out under ESRO management, and the project team is already established at the CNES Space Centre, Toulouse. Competitive contracts of eight months' duration, for the definition study phase, have been awarded to two European consortia, and it is anticipated that a contract for the development, fabrication and testing of the satellite will be placed with one of these consortia in October 1973, with a scheduled launch date of late 1976. The programme

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has been planned so that the satellite will be fully compatible with global systems, and will be carried out within the framework of the World Weather Watch as established by the World Meteorological organization.

- (iii) A telecommunication satellite programme. This is the most expensive and complex of the organization's programmes, and has been planned as a four-phase project. The first, or definition, phase has already been completed with configuration and over-all system studies by industry, and attention is now being concentrated on the second (technological and experimental) phase. Good progress has been made with the start of the technological support part of this phase, and intensive studies have just been completed on the optimum method of carrying out the "experimentation in orbit" part. Several options were considered, involving either participation in national or multinational programmes already under way or the development of a dedicated satellite. The latter solution has now been adopted, being considered the most attractive from the cost aspect and also taking into account the starting year (1980) of CEPT/EBU operations. Furthermore, the Orbital Test Satellite (OTS), as it has been named, could, because of its modular approach, be re-used later as a basic geostationary platform in support to other missions. The Requests for Proposals for the OTS were released to industry on 15 January 1973. Launch of the OTS would be around end-1976. As part of Phase 2, the organization is also participating in the Canada/United States Communications Technology Satellite (CTS), due to be launched in 1975. ESRO will supply the important high-powered travelling wave-tube amplifier and a parametric amplifier, and will also develop the solar cells and the flexible blanket to which they are attached.

In addition to the above three major application programmes, the organization is also actively engaged in studies of other possible future application projects, in particular TV-distribution, maritime and earth resources missions.

(d) Future programme

In looking at the future programme of the organization, several factors must be taken into consideration. Reference has already been made to the ESC decision to set up a European Space Agency and to the decision to "Europeanise", as soon as possible, as many as possible of the current national space projects. These two decisions will clearly have repercussions on the future programme, but it is much too early to envisage what the precise impact will be.

The above apart, the future programme will clearly comprise the continuation of current projects, i.e. COS-B, GEOS and IUE in the scientific field and Meteosat, Aerosat and the telecommunications programme in the applications field. In addition, the next scientific satellite project to be undertaken will shortly be selected from the various possibilities that have been studied, and the exploratory studies on new application programmes will continue.

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The major project under consideration for the future programme, however, is undoubtedly the organization's contribution to the post-Apollo programme. As mentioned earlier this would comprise responsibility for the Sortie Lab, and the ESRO Council, with the approval of the European Space Conference, has already agreed that the earlier preliminary definition studies carried out by the organization will be extended to cover Phase B studies, although these will not be completed until the end of 1973, the programme schedule calls for firm and detailed costs of the project to completion to be available by mid-1973. This will enable participating member States (the programme falls within the special project classification; i.e. participation is optional) to confirm their decision on the project, before 15 August 1973, which is the deadline set by the United States authorities. If the decision made is to go ahead, development (Phases C and D) would commence at the beginning of 1974, with a European Sortie Laboratory scheduled for flight readiness by 1979.

(e) Relations with non-member States

The status of observer has been granted to Austria, Norway and Ireland, whose representatives attend the ESRO Council meetings.

The links between the organization and the United States are very strong, the most important results of which are the provision by NASA of launchers for the ESRO scientific satellite programme and the space documentation service in which NASA, ESRO and ELDO co-operate.

The organization has also established useful contacts with Japan, India and the USSR. Relations with these countries have been formalized by an exchange of letters of which the main aim is to provide for the exchange of information on the space programme.

An Agreement has been concluded between the Government of Canada and ESRO for co-operation in the joint ESRO/DOC project on advanced space technology. This co-operation between the Department of Communications of Canada and ESRO is described in a Memorandum of Understanding which foresees that the objectives of the project are to flight test components and sub-systems of advanced technological content developed in Europe by incorporating them in the satellite developed under the Canadian Communications Technology Satellite project.

The failure of the tape recorders of the satellite TD has been the origin of a large international co-operation movement. The organization has called for the assistance of several countries, not members of the organization, either to use their own tracking stations or to install mobile stations in suitable locations. The United States, Chile, Argentina, India, Japan, New Zealand, Israel, Canada and Mexico have contributed to this operation.

(f) Relations with international organizations

For the past four years, ESRO's activities have been directed by decisions taken within the framework of the European Space Conference (ESC). This body has been established by decision of European Ministers of Science in order to co-ordinate

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European policy in the field of space research. For this reason, the main decisions relating to ESRO's future have to be taken at the Ministerial Conferences of the ESC which meet every year. In December 1972 the ESC agreed in particular that a new organization is to be formed out of ELDO and ESRO and approved the carrying out and management within a common European framework of the Spacelab, which constitutes the European participation in the United States shuttle and orbital system, and of a new launcher programme to replace the Europa III which will not be undertaken.

Co-operation with the European Launcher Development Organisation (ELDO) has been very close. It is intended in the future to use ELDO launchers for ESRO satellites and much information has been exchanged between the two organizations in order to ensure the compatibility of the two programmes.

ESRO participated in the activities devoted to the field of technology by the Council of Europe and the Western European Union. Each year, ESRO's report is presented to the Assembly of the Council of Europe by the Chairman of the ESRO Council.

The organization has been involved both directly and indirectly in the work of the United Nations and that of its specialized agencies. ESRO has been granted observer status to the United Nations Committee on the Peaceful Uses of Outer Space. The work of this Committee is studied by a "European Working Group on the United Nations work", in which the member States of ESRO and ELDO participate. The organization has also been associated with the work of the "Working Group on Remote Sensing of the Earth by Satellites".

ESRO has been granted the status of observer to the International Radio Consultative Committee of ITU and has attended several meetings of this institution.

The status of observer to ICAO has been granted to ESRO on a reciprocal basis.

As every year, ESRO has been invited by COSPAR to participate in its plenary meeting and has presented a report.

With a view to facilitating attainment of their objectives and tasks, IMCO and ESRO have envisaged to establish regular consultation with regard to matters of common interest in the field of application of space technology for maritime purposes. This co-operation will be formalized by an exchange of letters between the two organizations.

EBU and ESRO have decided to establish direct links for the study of the problem of satellite broadcasting in Europe and a consultative group has been created to pursue these objectives.

Finally, ESRO has attended several meetings organized by UNESCO.

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C. International Telecommunications Satellite Consortium (INTELSAT)

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

I. Membership of INTELSAT under the Interim and Definitive Arrangements

The International Telecommunications Satellite Consortium, known as INTELSAT, was established on 20 August 1964 by two international agreements, the Agreement Establishing Interim Arrangements for a Global Commercial Communications Satellite System (the Interim Agreement), concluded among Governments, and the Special Agreement, concluded among Governments or their designated communications entities, public or private. A third international agreement, the Supplementary Agreement on Arbitration, providing for the settlement of legal disputes, was subsequently concluded and entered into force on 21 November 1966. The members of the INTELSAT Consortium together own and operate the global commercial communications satellite system. The Interim and Special Agreements and the Supplementary Agreement on Arbitration remain in effect until superseded by the definitive arrangements, which will enter into force on 12 February 1973. These new arrangements will establish the International Telecommunications Satellite Organization, which will continue to be known as INTELSAT.

The INTELSAT definitive arrangements, like the INTELSAT interim arrangements, consist of two separate but related international agreements: the Agreement Relating to the International Telecommunications Satellite Organization "INTELSAT" (the Agreement), concluded among Governments (the Parties); and the Operating Agreement Relating to the International Telecommunications Satellite Organization "INTELSAT" (the Operating Agreement), concluded among Governments party to the Agreement or their designated telecommunications entities, public or private (the Signatories). The final texts of these two agreements were adopted by the Plenipotentiary Conference on Definitive Arrangements for INTELSAT on 21 May 1971 after more than two years of negotiation. The Agreement and the Operating Agreement were opened for signature in Washington, D.C. on 20 August 1971.

Article XX of the Agreement provides that the definitive arrangements will enter into force 60 days after the date on which the Agreement has been signed not subject to ratification, or has been accepted, approved or acceded to, by two thirds of the States parties to the Interim Agreement as of 20 August 1971,* provided (i) that such two thirds include those parties which hold, or whose signatories to the Special Agreement hold, at least two thirds of the investment quotas under the Special Agreement and (ii) that these parties or their designated telecommunications entities have signed the Operating Agreement. On 14 December 1972 Jamaica became the fifty-fourth member of INTELSAT to complete all action constituting final adherence to the definitive arrangements. These 54 members together

* On 20 August 1971 there were 80 members of INTELSAT.

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represent two thirds of the States which were parties to the Interim Agreement as of 20 August 1971 and approximately 83.93 per cent of the investment quotas held under the Special Agreement as of that date.

As of 9 February 1973, 73 of the 83 members of INTELSAT under the Interim Agreements had completed all necessary action constituting final adherence to the definitive arrangements.

In addition, seven countries had requested provisional application of the Agreement to take effect upon entry into force.

Membership in INTELSAT under the definitive arrangements is open to any country which is a member of the International Telecommunication Union or which was a member of INTELSAT under the interim arrangements.

The main purpose of the INTELSAT Organization will be to continue and carry forward on a definitive basis the design, development, construction, establishment, operation and maintenance of the space segment of the global commercial telecommunications satellite system as established under the provisions of the interim arrangements. The space segment is composed of the telecommunications satellites, and the tracking, telemetry, command, control, monitoring and related facilities and equipment required to support the operation of the satellites.

II. Organization and Structure of INTELSAT

A. Under the Interim Arrangements

Under the interim arrangements, the structure of INTELSAT has consisted of a governing body and a manager. The governing body has been the Interim Communications Satellite Committee which has had responsibility for the design, development, construction, establishment, maintenance and operation of the space segment of the global system. Representation on the Committee has been based upon investment quotas. The membership of the Committee has consisted of one representative from each Signatory to the Special Agreement whose original investment quota was not less than 1.5 per cent and one representative chosen by any two or more Signatories which had agreed to joint representation and whose original combined investment quotas totalled not less than 1.5 per cent. At its final meeting in January 1973, the Committee had 18 members representing 48 of the Signatories to the Special Agreement.

The Interim Agreement provided that the Communications Satellite Corporation was to act as the manager in the design, development, construction, establishment, operation and maintenance of the space segment, pursuant to general policies of the Committee and in accordance with specific determinations made by the Committee.

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B. Under the Definitive Arrangements

Under the definitive arrangements INTELSAT will have a structure consisting of an Assembly of Parties, a Meeting of Signatories, a Board of Governors, and an Executive Organ responsible to the Board of Governors.

(i) The Assembly of Parties

The Assembly of Parties will be composed of Governments which are Parties to the Agreement. The Assembly of Parties will give consideration to those aspects of INTELSAT which are primarily of interest to the Parties as sovereign States. It will have the power to consider general policy and long-term objectives of INTELSAT consistent with the principles, purposes and scope of activities of INTELSAT, and will give due and proper consideration to resolutions, recommendations and views addressed to it by the Meeting of Signatories or the Board of Governors.

The Assembly may, *inter alia*, formulate views or make recommendations to the other organs of INTELSAT in its consideration of general policy and long-term objectives; authorize the use of the INTELSAT space segment, or the provision of separate satellites by INTELSAT for specialized telecommunications services; take decisions on proposed amendments to the Agreement and propose, express its views, and make recommendations on amendments to the Operating Agreement; and select legal experts for arbitration tribunals.

Each representative to the Assembly will have one vote. Decisions on substantive matters will require the affirmative vote of two thirds of those present and voting, while decisions on procedural matters will require the affirmative vote of a simple majority of those present and voting.

The Assembly of Parties must have its first meeting within one year after entry into force of the Agreement and will meet at least every two years thereafter.

(ii) The Meeting of Signatories

The Meeting of Signatories will be composed of all Signatories to the Operating Agreement. It will give due and proper consideration to resolutions, recommendations and views addressed to it by the Assembly of Parties or the Board of Governors. The functions of the Meeting of Signatories will include, *inter alia*, the consideration and expression of views to the Board of Governors on the Board's annual report and financial statements; consideration of Board reports on future programmes; decisions on proposed amendments to the Operating Agreement and expression of views and recommendations on amendments to the Agreement; and the establishment of general rules, upon the Board's recommendations and for its guidance, concerning the approval of earth stations

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to access the INTELSAT space segment, allotment of capacity in the space segment, and the establishment and adjustment of satellite utilization charges.

The decision-making process in the Meeting of Signatories will be the same as in the Assembly of Parties. The Meeting of Signatories must have its first meeting within nine months after the entry into force of the Agreement and will meet in each calendar year thereafter.

(iii) The Board of Governors

The Board of Governors will have responsibility for the design, development, construction, establishment, operation and maintenance of the INTELSAT space segment and for carrying out other activities undertaken by INTELSAT pursuant to determinations made by the Assembly of Parties in certain specified instances as set forth in the Agreement. The Board shall give due and proper consideration to resolutions, recommendations and views addressed to it by the Assembly of Parties or the Meeting of Signatories.

The Board will be composed of those Signatories whose investment shares, individually or in groups, are not less than a specified investment share, plus up to five Governors representing groups of at least five Signatories all located within the same ITU region. The investment share required for representation will be adjusted periodically by the Meeting of Signatories to maintain total Board membership within prescribed limits required for representation.

As a general rule, each Signatory will have an investment share equal to its percentage of all utilization of the space segment by all Signatories. Each governor's vote shall be equal to that part of the investment share of the Signatory, or group of Signatories, he represents, which is derived from the utilization of the INTELSAT space segment for services of the following types:

(i) International public telecommunications,

(ii) Domestic public telecommunications between areas not under the jurisdiction of the State concerned or between areas separated by the high seas, and

(iii) Domestic public telecommunications between areas not linked by terrestrial wide-band facilities and which are separated by natural barriers of such an exceptional nature that they impede the viable establishment of such terrestrial facilities, provided that the Meeting of Signatories gives the necessary advance approval.

No Governor may vote more than 40 per cent of the total votes represented on the Board of Governors.

The Board is to endeavour to take decisions unanimously, but failing unanimity, the Board is to take decisions on all substantive issues by the affirmative vote of at least four Governors having at least two thirds of the

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voting power represented on the Board, or by the affirmative vote of all Governors less three, regardless of their total voting power. Decisions on procedural issues will require the affirmative vote of a simple majority of Governors, each having one vote.

The first meeting of the Board is scheduled to convene on 14 March 1973 and will meet thereafter as often as necessary but at least four times a year.

(iv) The Executive Organ

The Executive Organ is to be headed, until 31 December 1976, by a Secretary-General who will be responsible to the Board of Governors for management services of an administrative and financial nature which are enumerated in annex A to the Agreement. The Secretary-General is to be appointed by the Board of Governors. By 31 December 1976 a Director-General responsible for all management services is to be appointed by the Board of Governors to head the Executive Organ; his appointment is to be confirmed by the Assembly of Parties.

As a matter of priority after entry into force of the Agreement, the Board of Governors is to arrange a management services contract between the Communications Satellite Corporation and INTELSAT for the performance of technical and operational management services for INTELSAT, as specified in annex B to the Agreement and in accordance with the guidelines set forth therein, for a period terminating at the end of the sixth year after the date of entry into force of the Agreement. The management services contractor is to be responsible directly to the Board of Governors until the assumption of office by the first Director-General and, thereafter, until the end of the six-year period, is to be responsible to the Board through the Director-General.

III. INTELSAT Activities

A. Satellites

Three more INTELSAT IV satellites became operational in 1972, bringing to a total of four the number of these satellites in operation in the INTELSAT global system. The first INTELSAT IV satellite was launched on 25 January 1971 and entered into service on 26 March 1971 in the Atlantic Region. The second INTELSAT IV was launched on 19 December 1971 for service in the Atlantic Region on 19 February 1972. The third INTELSAT IV was launched on 22 January 1972 and became operational on 14 February 1972 in the Pacific Region. A global INTELSAT IV system was accomplished with the launch of a fourth INTELSAT IV on 13 June 1972 and its subsequent commencement of operation on 30 July 1972 in the Indian Ocean Region.

The two Atlantic Region INTELSAT IV satellites are positioned at 330° East Longitude and 335° East Longitude respectively. The Pacific Region INTELSAT IV satellite is positioned at 174° East Longitude, and the Indian Ocean Region INTELSAT IV is positioned at 61.4° East Longitude.

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INTELSAT IV satellites are equipped with separate global beam antennas for full coverage of the three regions. They are also equipped with two spot beam antennas which allow the satellite transmission to be much more concentrated over a limited geographic area. By careful pointing of these beams to high density traffic areas, greater capacity can be derived from the satellite.

Each INTELSAT IV spacecraft has a design life of seven years, and possesses a design capacity of between 3000 to 9000 circuits, depending on the transponder configuration, or 12 TV channels, or certain combinations thereof.

Prior to the availability of INTELSAT IV satellites in all three regions, service was provided by INTELSAT III satellites. At the present time these satellites serve as emergency spares for INTELSAT IV satellites in contingency situations.

The number of regular full-time units of utilization* in use as of 31 December 1972 was 4760 in the Atlantic area, 1867 in the Pacific area, and 900 in the Indian Ocean area, for a total of 7527 units. This is an increase since 31 December 1971 of 1234 in the Atlantic, 213 in the Pacific, and 246 in the Indian Ocean or a total increase of 1693 full-time units of utilization.

B. Earth Stations

The earth stations which use the INTELSAT system are owned in accordance with each country's domestic laws and regulations. As of 9 February 1973, there were 81 antennas at 66 earth stations in 49 countries using INTELSAT satellites. This was an increase in 1972 of 16 antennas, 13 earth stations and 10 countries. A complete listing of antennas and their locations follows:

ATLANTIC REGION

Argentina	Belgium (Lessive)
(Balcarce 1)	Brazil (Tangua)
(Balcarce 2)	Canada
Ascension Island	(Mill Village 1)
Barbados	(Mill Village 2)

* INTELSAT has adopted the following definition of a unit of satellite utilization:

One unit of satellite utilization for INTELSAT III and IV satellites is defined as the measure of entitlement, in accordance with allotment by the Interim Communications Satellite Committee, to the use of an INTELSAT satellite for the establishment via two standard earth stations of one end of a two-way telephone circuit.

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ATLANTIC REGION (continued)

Chile (Longovilo)
Colombia (Choconta)
Ecuador (Quito)
France
 (Pleumeur-Bodou 2)
 (Trois Ilets)
Germany, Federal Republic
 (Raisting 2)
 (Raisting 3)
Greece
 (Thermopylae 2)
Iran (Asadabad 1)
Israel
 (Emeq Ha'ela)
Italy (Fucino 1)
Ivory Coast (Abidjan)
Jamaica
 (Prospect Pen)
Jordan (Baqa)
Malagasy Republic
 (Philbert Tsiranana)
Mexico
 (Tulancingo 1)

PACIFIC REGION

Australia
 (Carnarvon 2)
 (Moree)
Canada
 (Lake Cowichan)
China
 (Shanghai)
 (Peking)
 (Taipei 1)
Japan (Ibaraki 2)
 (Ibaraki 3)
Korea (Kum San 1)
New Zealand
 (Warkworth)

Morocco (Sehoulis)
Nicaragua (Managua)
Nigeria (Lanlate 1)
Panama (Utibe)
Peru (Lurin)
Senegal (Gandoul)
Spain (Aquimes)
 (Buitrago 1)
Sweden (Tanum)
Trinidad
 (Matura Point)
United Kingdom
 (Goonhilly 2)
 (Goonhilly 3)
United States
 (Andover 2)
 (Etam 1)
 (Cayey)
Venezuela
 (Camataqua)
Zaire (Nsele)

Philippines
 (Tanay 1)
Thailand (Si Racha 1)
United Kingdom
 (Hong Kong 1)
United States
 (Bartlett)
 (Brewster)
 (Jamesburg)
 (Mc Murdo Sound
 Antarctica)
 (Paumalu 1)
 (Paumalu 2)
 (Pulantat)

INDIAN OCEAN REGION

Australia (Ceduna)
Bahrain (Ras Abu Jarjur)
East Africa
 (Longonot 1, Kenya)
France
 (Pleumeur-Bodou 1)
Germany, Federal Republic
 (Raisting 1)
Greece
 (Thermopylae 1)
India (Vikram)
Indonesia
 (Djatiluhur 1)
Italy (Fucino 2)

Japan (Yamaguchi)
Kuwait
 (Umm-Al-Aish 1)
Lebanon
 (Arbaniyeh)
Malaysia (Kuantan 1)
Pakistan (Deh Mandro)
Philippines (Tanay 2)
Singapore (Sentosa 1)
Spain (Buitrago 2)
Thailand (Si Racha 2)
United Kingdom
 (Goonhilly 1)
 (Hong Kong 2)

As of 9 February 1973, an additional seven antennas at seven earth stations had been approved by the Committee for initial access to INTELSAT satellites but had not yet entered into service. These stations were located in the Atlantic and Indian Ocean Regions, as follows:

Atlantic Ocean Region (5)

Gabon
Kuwait
Netherlands
Saudi Arabia
Yugoslavia

Indian Ocean Region (2)

China
Saudi Arabia

Pursuant to arrangements approved by the Committee, INTELSAT tracking, telemetry command and monitoring functions are performed at four earth stations - those at Fucino, Italy; Carnarvon, Australia; Paumalu (Hawaii), and Andover (Maine), United States.

C. Utilization Charge

In 1972 the Committee decided to reduce the charge for full-time leasing of a unit of satellite utilization, i.e., of a two-way voice-grade link between an earth station and an INTELSAT satellite. This reduction, from \$13,000 to \$11,160 per unit per annum, took effect on 1 January 1973.

D. International System and Organization of Space
Communications (INTERSPUTNIK)

The following text has been submitted to bring up to date the section on INTERSPUTNIK (paras. 573-581 of the Review).

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The Agreement on the Establishment of the INTERSPUTNIK International System and Organization of Space Communications (see para. 574 of the Review) came into force on 12 July 1972 after six States had deposited instruments of ratification: Bulgaria, on 12 February 1972; Hungary, on 31 March 1972; Mongolia, on 21 April 1972; the German Democratic Republic, on 6 July 1972; Czechoslovakia, on 12 July 1972; and the Union of Soviet Socialist Republics, on 12 July 1972. Subsequently two more States deposited instruments of ratification: Poland, on 20 October 1972; and Cuba, on 29 November 1972.

IV. NON-GOVERNMENTAL ORGANIZATIONS

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

The following changes will bring up to date the section on COSPAR (paras. 662-686 of the Review).

For paragraph 665 substitute

665. The election carried out at the XVth Plenary Meeting of COSPAR, held in Madrid, Spain, 10-24 May 1972, resulted in the following composition of the COSPAR Bureau for the period 1972-1975:

President: Prof. C. de Jager (Netherlands) (IAU)

Vice-Presidents: Acad. A. A. Blagonravov (USSR)
Dr. H. Friedman (USA)

Members: Acad. G. Barta (Hungary)
Prof. E. A. Lauter (German Democratic Republic)
Prof. K. Maeda (Japan)
Sir Harrie Massey (United Kingdom)

Paragraph 668, for Working Group 5 substitute

Working Group 5

Panel 5.A. Gravitational biology
5.B. Radiation biology
5.C. Exobiology
5.D. Planetary quarantine

For paragraph 669 substitute

669. The XVth Plenary Meeting of COSPAR decided to disband the Consultative Group on Potentially Harmful Effects of Space Experiments, and to attach its Panel on Planetary Quarantine to COSPAR Working Group 5 as Panel 5.D. The Advisory Committee on Data Problems and Publications continues its activities.

For paragraphs 672-674 substitute

672. On behalf of COSPAR Working Group 1, the new COSPAR World List of Tracking Stations is being prepared and should be published in the course of 1973.

673. After preparation of two reports by the Joint COSPAR/IUCSTP Special Study Group for the International Magnetospheric Study (IMS) 1976-1978, entitled

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"Spacecraft missions" and "Ground-based, balloon and rocket programs", the proposed programme of research in this area has been approved by COSPAR. A new Steering Committee for IMS has been created, composed of International Union and COSPAR representatives, which will, in co-operation with various space agencies, continue the preparations for implementation of the said programme. COSPAR Working Group 2 will continue its contributions to the IMS plans.

674. The preparation of the manuscript for the new COSPAR International Reference Atmosphere (CIRA 1972), resulting from several years of intensive studies, has been completed by COSPAR Working Group 4 and will be published in the first half of 1973. Reviews of progress in atmospheric research, having the purpose of improving the existing atmospheric models, will be continued by Working Group 4.

For paragraphs 676-684 substitute (except where indicated):

676-677. Continuing its interest in the area of earth surveys, COSPAR, through its Working Group 6, established co-operation with the United Nations Working Group on Remote Sensing of the Earth from Satellites. On the request of the United Nations, Working Group 6 elaborated the report entitled "Applications of space techniques to some environmental problems - Preliminary observing system considerations for monitoring important climate parameters". The final review draft of this report was available at the time of the United Nations Conference on the Human Environment in June 1972, and the final version appeared in September 1972. COSPAR is prepared to respond to further requests of the United Nations concerning the use of space techniques in problems related to the environment and, in conjunction with the 1973 Plenary Meeting of COSPAR, a special symposium on approaches to earth survey problems through the use of space techniques will take place. This symposium is being planned as a means of establishing dialogue between experts in space-based remote sensing techniques and experts in the user disciplines, in order to develop scientific and observational requirements that can serve to focus current and future developments in space technology on problems in the scientific disciplines that benefit from newly developed observational capabilities. The above symposium will be organized in collaboration with various international organizations.

678. The constant review of new data in the field of lunar and planetary exploration, obtained by space techniques, will be continued by COSPAR Working Group 7. During the 1973 COSPAR Meeting, the scientific sessions, with presentations of the latest results of lunar exploration and the latest results from Venus and Mars missions, will be organized.

679. In 1973, the XVIth Plenary Meeting of COSPAR will take place in Constance, Federal Republic of Germany, during the period 23 May-6 June. The meeting will include the joint specialized symposia listed below, as well as the traditional business and public sessions of COSPAR bodies.

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(d) Co-operation with other organizations

680. The active co-operation of COSPAR with a number of non-governmental international organizations and several intergovernmental organizations continues.

(i) Non-governmental international organizations

(a) ICSU and ICSU bodies

As in the past, close contact is being maintained with 11 international scientific unions members of COSPAR through the direct participation of their representatives in the work of the COSPAR Plenary, Executive Council, and Working Groups, and through the organization of joint scientific symposia. During 1972, the following joint symposia were held:

- URSI/IAU/COSPAR Symposium on Planetary Atmospheres and Surfaces, 10-13 May 1972, Madrid, Spain;
- COSPAR/IAGA(IUGG)/URSI Symposium on Critical Problems of Magnetosphere Physics, 11-13 May 1972, Madrid, Spain;
- IAU/COSPAR Symposium on X- and Gamma-Ray Astronomy (Non-Solar), 11-13 May 1972, Madrid, Spain;
- IAMAP(IUGG)/COSPAR/WMO International Radiation Symposium, Sendai, Japan, 26 May-2 June 1972;
- In addition, under the auspices of the Steering Committee on Satellite Beacon Activities of COSPAR, the Symposium on the Future Application of Satellite Beacon Measurements was held at Graz, Austria, in June 1972. This symposium, though not co-sponsored by international unions, received their co-operation.

In 1973, the following joint scientific symposia will be organized:

- COSPAR/IAU Colloquium on Lunar Dynamics and Observational Coordinate Systems (IAU Colloquium No. 24), 15-17 January 1973, Houston, Texas, USA;
- IAG(IUGG)/COSPAR Symposium on the Use of Artificial Satellites in Geodesy and Geodynamics, 14-21 May, Athens, Greece;
- COSPAR Symposium on Approaches to Earth Survey Problems through the Use of Space Techniques (with the participation of several ICSU international unions and scientific committees and some other international organizations), 23-25 May 1973, Constance, Federal Republic of Germany, (see also items 676., 677.);
- URSI/COSPAR/IAGA(IUGG) Symposium on Methods of Measurements and Results of Lower Ionosphere Structure, 23-25 May 1973, Constance, Federal Republic of Germany;

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- IAMAP(IUGG)/COSPAR Symposium on Noctilucent Clouds and Interplanetary Dust, 24-25 May 1973, Constance, Federal Republic of Germany;
- IAU/COSPAR Symposium on Exploration of the Planetary System (IAU Symposium No. 65), 5-8 September 1973, Toruń, Poland;
- IAGA(IUGG)/COSPAR/URSI Symposium on the Dynamics, Chemistry and Thermal Processes in the Ionosphere, September 1973, Kyoto, Japan.

COSPAR continues also its close co-operation with other ICSU bodies and services, such as: Special Committee on Solar-Terrestrial Physics (SCOSTEP - formerly Inter-Union Commission on Solar-Terrestrial Physics, IUCSTP); Inter-Union Commission on the Studies of the Moon (IUCM); Inter-Union Commission for Frequency Allocations (IUCAF); Scientific Committee on Oceanic Research (SCOR); Scientific Committee on Antarctic Research (SCAR); and International Ursigram and World Days Service (IUWDS).

(b) Other non-governmental organizations

/No changes./

(ii) Intergovernmental organizations

(a) United Nations and the specialized agencies

United Nations

"The message of the Secretary-General of the United Nations, His Excellency, Ambassador Kurt Waldheim, to the XVth COSPAR Plenary Meeting, held in May 1972, Madrid, Spain, included the following:

'I am confident that COSPAR will continue to encourage and accelerate the international co-operation in this field. At the same time, it is my fervent hope that the co-operative attitude expressed in the scientific community will serve as a means of co-operation which might contribute tremendously to the improvement of friendly relations and mutual understanding and confidence in other areas of international relations.

...

'I am most gratified that COSPAR has devoted much attention in the recent years to matters relating to the practical applications of space technology, as exemplified by the recent collaboration between two important Working Groups of COSPAR and the United Nations which provide the focus within the two organizations for the co-ordination of activities dealing with remote sensing technology and its application to

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earth problems. Such close complementary relationship between COSPAR and the United Nations will greatly assist in bringing to the attention of the world community, the new opportunities afforded by space techniques which can be applied to a variety of scientific, economic and social problems of importance to all countries irrespective of their state of technological evolution.'

"The COSPAR community greatly appreciated the above message and the continued interest of the United Nations in its activities. (The information on the co-operation between COSPAR and the United Nations Working Group on Remote Sensing of the Earth from Satellites is given in more detail under items 676., 677., of this supplement.)

"COSPAR was represented at the session of the United Nations Scientific and Technical Sub-Committee (New York, 3-12 May) by the Vice-President of COSPAR, Acad. A. A. Blagonravov, assisted by Dr. M. Tepper, the Chairman of COSPAR Working Group 6. Dr. Tepper also participated in the meeting of the United Nations Working Group on Remote Sensing of the Earth by Satellites, held in New York during the above session of the United Nations Sub-Committee.

"Prof. C. de Jager, the newly elected President of COSPAR, represented our Committee at the Meeting of the United Nations Committee on Peaceful Uses of Outer Space, held in New York on 5-15 September 1972. His statement was received with appreciation by the Committee, as witnessed by the following text included in the Official Records of the General Assembly, Twenty-seventh Session, Supplement No. 20 (A/8720), which reads:

'The Committee welcomed the co-operation offered by the Committee on Space Research (COSPAR) and the statement made at the current session by its newly elected Chairman, Professor Cornelius de Jager. The Committee took note, in particular, of the study prepared by Working Group 6 of COSPAR on the application of remote sensing to environmental problems, the substance of which had been presented by its representative to the last session of the Scientific and Technical Sub-Committee.'

"COSPAR derives great satisfaction from its consultative status with the United Nations Committee on Peaceful Uses of Outer Space and is prepared to further contribute its advice to the United Nations in the fields of its competence, if requested."

WMO

"The representative of WMO continues to participate in the work of COSPAR Working Group 6 and the COSPAR representative in the activities of the WMO CIMO Working Group on Satellite Instrumentation for Meteorology.

"COSPAR, through its Working Group 6, continues to perform an advisory role in the elaboration of the Joint WMO/ICSU Global Atmospheric Research

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Program (GARP) and its representative participated in the Planning Conference on the First GARP Global Experiment (FGGE), held at Geneva, Switzerland, 5-8 September 1972.

"The statement of the WMO representative to the XVth Plenary Meeting of COSPAR (Madrid, May 1972) contained the following formulation:

'COSPAR provides most of the answers on research and technical questions raised by other specialized agencies and organizations. Experience has shown the usefulness of collaboration between WMO and COSPAR, and WMO believes that COSPAR shares this opinion.'

WHO /No changes./

ITU /No changes./

(b) Other intergovernmental organizations

ESRO /No changes./

(e) Publications and documentation

681. (i) In 1972, the 12th volume of Space Research and the 10th volume of Life Sciences and Space Research were published by the Akademie-Verlag, Berlin, German Democratic Republic. This brings the total number of pages of these Proceedings, published during the period 1960-1972, to well over 23,000.
- (ii) As of December 1972, the number of issues of the COSPAR Information Bulletin reached 64, with a total number of pages: 4,897.
- (iii) Report from the XVth Plenary Meeting of COSPAR was published by the COSPAR secretariat in October 1972 (254 pages).
- (iv) The new COSPAR Directory of Organizations and Members appeared in January 1973 (90 pages).
682. Irregular COSPAR publications:
- (i) Eighth issue of COSPAR Transactions appeared in December 1972.
- (ii) There were no new COSPAR Technique Manuals published in 1972.
- (iii) The new COSPAR International Reference Atmosphere (CIRA 1972) is being printed and should appear in the first half of 1973 (publisher: Akademie-Verlag, Berlin, German Democratic Republic).

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683. Items (i) and (ii) listed in paragraph 682 are on sale at the COSPAR secretariat, as well as items (ii) and (iv) indicated in paragraph 681. Other publications are available from the publisher.

684. The up-to-date version of the "COSPAR Guide to Rocket and Satellite Information and Data Exchange", approved by the XVth Plenary Meeting of COSPAR, was published in December 1972 as COSPAR Transactions No. 8, and this publication, together with the "IUCSTP Guide for International Exchange of Data in Solar-Terrestrial Physics" of October 1969, serves as the basis for the exchange and dissemination of rocket and satellite information and data.

C. International Astronautical Federation (IAF)

The following changes will bring up to date the section on IAF (paras. 687-721 of the Review):

Paragraph 688

For the Federation now has 57 societies, read the Federation now has 55 societies.

For paragraphs 694 and 695 substitute

694. The Bureau of IAF for the year 1972/73 is composed as follows:

President:	Prof. L. G. Napolitano (Italy)
Past President:	Prof. A. Jaumotte (Belgium)
Vice-Presidents:	Mr. M. Barrère (France)
	Dr. L. Jaffe (USA)
	Prof. R. Pešek (Czechoslovakia)
	Prof. L. I. Sedov (USSR)
President, IAA:	Dr. C. S. Draper (USA)
President, IISL:	Prof. E. Pépin (France)
General Counsel:	Dr. V. Kopal (Czechoslovakia)

695. The General Counsel is one of three appointive officers. The other two are the Honorary Secretary, Mr. R. Greinacher (Switzerland) and the Executive Secretary, Miss H. van Gelder (United States), who supervises the operation of the secretariat located at 250 rue Saint-Jacques, 75005 - Paris, France. A brochure giving background information on the structure, purposes and evolution of the Federation since its founding has been published and is available from the Secretariat upon request.

For paragraphs 699-704 substitute

699. "Space Activity: Impact on Science and Technology" will be the general theme of the twenty-fourth Congress (Baku, USSR, 1973) and the subject of a special forum session. The IAF Invited Lecture will also relate to the general

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theme. Several sessions will deal with the utilization of space technology in different areas, such as observation of the earth and its environment (including meteorology), communications, navigation, space power, and medicine. The programme includes technical sessions on scientific spacecraft systems, space stations, astrodynamics, fluid mechanics aspects of space flight, space transportation problems (earth to orbit and orbit to orbit), space structures technology, and propulsion. Concerned particularly with youth are sessions on the impact of space on science and technology education, safety in youth rocket experiments, and the Third IAF International Student Conference.

700-701. Within the framework of the Congress, the International Academy of Astronautics is organizing symposia and discussion sessions on the following subjects: a Martian International Laboratory (MIL), an Orbital International Laboratory (OIL), cost reduction in space operations, space rescue and safety, communication with extra-terrestrial intelligence (CETI), effects of relativity in present-day space travel, and the history of astronautics and rocketry. The International Institute of Space Law will hold its 16th Colloquium on the Law of Outer Space during the Congress.

702. Since 1962, the IAF Bioastronautics Committee has been responsible for organizing the life sciences section of the programme of the annual congresses. Two of the sessions planned for the twenty-fourth Congress will be dedicated to the twenty-fifth anniversary of the World Health Organization. The Committee also makes recommendations for other activities which may be appropriately undertaken in the field of bioastronautics and maintains liaison with Academy committees concerned with related problems.

703. A Committee on Application Satellites (CAS) established in 1968 has regularly organized at the annual Congress discussions of different types of application satellites, which were divided into four main groups: communications, navigation and control, meteorology, and earth resources. Two of the sessions planned for the twenty-fourth Congress will be dedicated to the centenary which is being celebrated this year by the World Meteorological Organization. The Committee compiled a comprehensive document based on material presented at the 1971 Congress which served as a contribution to the Conference on the Human Environment held at Stockholm in June 1972.

704. Since 1963 the Education Committee has organized each year special meetings to study methods, curricula and other problems relating to the teaching of astronautics. Support and co-operation was given by UNESCO for the meetings held in 1963 and 1965. The Education sessions in 1970 were dedicated to the International Education Year promoted by the United Nations. In 1973 emphasis will be placed on the impact of space on science and technology education. A Sub-Committee was appointed by the Education Committee to collect and compile source material for education in astronautics at the secondary level.

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Paragraph 706: add

The fourth of these lectures was given at Vienna in October 1972 by Dr. H. G. Stever, Director of the National Science Foundation of the United States of America, and was entitled "The impact of science on world development".

Paragraph 708: add

The second Student Conference was held during the twenty-third IAF Congress in Vienna in 1972.

For paragraph 712 substitute

712. The Federation has observer status with the Scientific and Technical Sub-Committee of the United Nations Committee on Peaceful Uses of Outer Space and category 2 consultative status with the United Nations Economic and Social Council. The Federation has set up an advisory group on IAF/UN co-operation whose members will also serve as IAF observers to the United Nations Sub-Committee.

For paragraph 715 substitute

715. Reciprocal representation at meetings of these organizations and the Federation assures regular liaison between them. The Federation also organized a Symposium on Nuclear Power and Propulsion Devices in Space in co-operation with the International Atomic Energy Agency, which was held at the headquarters of the IAEA in Vienna in October 1972.

For paragraph 724 substitute

724. The present members of the Board are:

President:	Dr. C. S. Draper (United States of America)
Past-President:	Dr. F. J. Malina (United States of America)
Vice-President:	Dr. H. A. Bjurstedt (Sweden)
	Prof. E. A. Brun (France)
	Prof. A. Mikhailov (Union of Soviet Socialist Republics)
	Prof. F. Zwicky (Switzerland)

Trustees: Section 1 (Basic Sciences)

	Prof. M. Nicolet (Belgium)
	Prof. N. Boneff (Bulgaria)
	Dr. F. L. Whipple (United States of America)
	Dr. H. Bondi (United Kingdom)

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Section 2 (Engineering Sciences)

Prof. R. Pešek (Czechoslovakia)
Prof. A. Eula (Italy)
Dr. J. M. J. Kooy (Netherlands)
Prof. L. I. Sedov (Union of Soviet Socialist Republics)

Section 3 (Life Sciences)

Prof. R. K. Andjus (Yugoslavia)
Dr. A. Graybiel (United States of America)
Prof. R. Margaria (Italy)
Prof. O. G. Gazenko (Union of Soviet Socialist Republics)

President, IAF: Prof. L. G. Napolitano (Italy)
President, IISL: Prof. E. Pépin (France)

Paragraph 727: add

An annual report of the President is also obtainable upon request.

For paragraphs 731-734 substitute

731. The Fifth International Space Rescue Symposium of the Space Rescue and Safety Studies Committee took place in Vienna in October 1972, during the IAF Congress. These annual symposia are devoted to an analysis of emergency situations which might arise in manned space flights, the physiological, engineering and communications problems involved, and possible solutions, including the international co-operation needed for rescue operations. The next symposium is scheduled for 1973 at Baku.

732. An Orbital International Laboratory (OIL) discussion panel will be organized at Baku in 1973, at which the results of the four OIL symposia that were held between 1968 and 1971 will be reviewed in the light of the progress made with regard to international co-operation in orbital laboratory projects.

733. The sixth in the series of symposia on the history of astronautics, which began in 1967, took place at the IAF Congress in October 1972. Organized by the Committee on the Development of the History of Rockets and Astronautics, these symposia comprise autobiographical and biographical accounts of hitherto unknown or little known research and experiments. The Seventh History of Astronautics Symposium will take place at Baku in 1973 and will consist of new contributions to the historical literature on research pertaining to the development of astronautics initiated before 1953.

734. The Committee on Cost Reduction in Space Operations held its Second Symposium during the IAF Congress in 1972 on the subject of management and cost aspects of

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space projects from an international viewpoint. A third meeting is being organized for 1973 at Baku. It will deal with low-cost concepts in design and manufacturing, and in operations and management.

Paragraph 736: for the last three sentences substitute

A fifth symposium was held in 1972 in Vienna, to examine the implications of developments since 1969 in regard to manned research on the moon. A first discussion panel on the subject of a manned Martian International Laboratory (MIL) will be held at Baku in 1973.

For paragraphs 737-739 substitute

737. The Scientific-Legal Liaison Committee organized a round table discussion in Vienna, in 1972, on the subject of activities and experiments in space which might have harmful effects on the environment. The Committee, which is composed of scientists and lawyers, has already discussed the possibility of defining a boundary between air space and outer space, and continues to study this and other questions of mutual concern to the scientific and legal communities.

738. The Space Relativity Committee is organizing a first symposium on the effects of relativity in present-day space travel which will concentrate on experimental and engineering aspects in regard to instrumentation, navigation, measurement techniques, etc.

739. A first review meeting on communication with extra-terrestrial intelligence (CETI) organized by the Academy was held at Vienna in 1972. The present status of studies undertaken in the fields of astronomy, biology, detection of intelligent extra-terrestrial signals, and deciphering was reviewed. A second meeting will be held at Baku in October 1973, during the IAF Congress.

Paragraph 753

Under "Members:", for Dr. C. Horsford (United Kingdom)

read Dr. I. Ph. Diedericks-Verschoor (Netherlands)

For paragraphs 757-760 substitute

757. The 1970 Colloquium was dedicated to the twenty-fifth anniversary of the United Nations and was the occasion of an exhaustive review of all the space law problems dealt with by the United Nations, specialized agencies, and other international organizations. In 1971, the Space Law Colloquium was concerned mainly with orbiting laboratories and laboratories on the moon, the protection of the earth's environment, earth resources, and space communications. The 15th Colloquium, which was held in 1972 in Vienna, considered the legal problems of earth resources, trends in the law of space communications and problems arising

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from the interpretation and application of the convention on liability. In addition, the Board of Directors added three pioneering topics relating to law-making for outer space, responsibility for space activity, development of air and space law, divergencies and convergencies.

758. The 16th Colloquium, which will take place at Baku, in 1973, will discuss in particular the impact of space law on general international law; legal aspects of direct broadcasts, and of earth resources research and environment; legal problems concerning the moon and other celestial bodies; and the legal régime of earth orbital stations.

759. A third Symposium on the teaching of space law will be held at the time of the IAF Congress at Baku in 1973. The previous symposia took place in Buenos Aires in 1969 and in Brussels in 1971. The professors of space law and the lawyers present at the Brussels Symposium adopted a resolution calling the attention of all competent authorities in educational matters throughout the world to the great importance of establishing specific lectures on space law in universities, legal and technical institutes, and schools with analogous programmes.

760. The Institute is preparing a booklet on the IISL to be published in 1973.

Paragraph 765: for last sentence substitute

The Bibliography for 1972 is in preparation.

For paragraphs 766 and 767 substitute

766. The proceedings of the annual colloquia have been regularly issued since the first colloquium; each volume contains the reports and papers presented at the session and, since four years, a summary of the discussions. They are prepared by the Law Librarian of the University of California and distributed by Rothman and Co. (South Hackensack, New Jersey).

767. The Institute is preparing a complete and revised edition of its world-wide survey on the teaching of space law which will be used as a basis of the discussions at the third Symposium on the subject, to be held at Baku in 1973. The first survey was published in 1969 for the first Symposium and was up-dated in 1971 for the second Symposium.



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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 1973*

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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. This issue is the second supplement.

** Not included. No additional information has been received.

*** Not included. Aspects of these activities are referred to in paragraphs 19 and 31, on pages 6 and 10 respectively.